SEW EURODRIVE

Explosion-Proof Gear Units R..7, F..7, K..7, S..7 Series, Spiroplan® W

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Operating Instructions

SEW EURODRIVE

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1 General Information

1.1 How to use the operating instructions

The operating instructions are an integral part of the product and contain important information on operation and service. The operating instructions are written for all employees who assemble, install, startup, and service this product.

The operating instructions must be accessible and legible. Make sure that persons responsible for the system and its operation, as well as persons who work independently on the unit, have read through the operating instructions carefully and understood them. Consult SEW-EURODRIVE if you have any questions or if you require further information.

1.2 Structure of the safety notes

The safety notes in these operating instructions are structured as follows:

Symbol	SIGNAL WORD!
	Nature and source of hazard. Possible consequence(s) if disregarded. • Measure(s) to avoid the hazard.

Symbol	Signal word	Meaning	Consequences if disregarded
Example: General hazard Specific hazard, e.g. electric shock	**HAZARD!**	Imminent hazard	Severe or fatal injuries
	WARNING!	Possible hazardous situation	Severe or fatal injuries
	CAUTION!	Possible hazardous situation	Minor injuries
	CAUTION!	Possible damage to property	Damage to the drive system or its environment
	NOTE ON EXPLOSION PROTECTION	Important note on explosion protection	Suspension of explosion protection and resulting dangers
	NOTE	Useful information or tip. Simplifies handling of the drive system.	

1.3 Rights to claim under limited warranty

Adhering to the operating instructions is a prerequisite for fault-free operation and the fulfillment of any right to claim under warranty. Read the operating instructions before you start working with the unit.

1.4 Exclusion of liability

You must comply with the information contained in these operating instructions to ensure safe operation of the explosion-proof R..7, F..7, K..7, S..7, SPIROPLAN® W series gear units and to achieve the specified product characteristics and performance requirements. SEW-EURODRIVE assumes no liability for injury to persons or damage to equipment or property resulting from non-observance of these operating instructions. In such cases, any liability for defects is excluded.

2 Safety Notes

The following basic safety notes are intended to prevent injury to persons and damage to property. The operator must ensure that the basic safety notes are read and observed. Make sure that persons responsible for the system and its operation, as well as persons who work independently on the unit, have read through the operating instructions carefully and understood them. If you are unclear about any of the information in this documentation, please contact SEW-EURODRIVE.

2.1 Preface

The following safety notes are primarily concerned with the use of gear units. If using gearmotors, please also refer to the safety notes for motors in the corresponding operating instructions.

Also observe the supplementary safety notes in the individual sections of these operating instructions.

2.2 General information

⚠ HAZARD!

During operation, the motors and gearmotors can have live, bare and movable or rotating parts as well as hot surfaces, depending on their enclosure.

Explosive gas mixtures or dust concentrations in combination with hot, energized and moving parts of electrical machinery can cause serious injury or death.

Severe or fatal injuries.

- All work related to transportation, storage, setup/mounting, connection, startup, maintenance and repair may only be carried out by qualified personnel, in strict observation of:
  - The relevant detailed operating instructions
  - The warning and safety signs on the motor/gearmotor
  - All other project planning documents, operating instructions and wiring diagrams belonging to the drive
  - The specific regulations and requirements for the system
  - The national/regional regulations governing safety and the prevention of accidents
- Never install damaged products
- Immediately report any damage to the shipping company

Removing covers without authorization, improper use as well as incorrect installation or operation may result in severe injuries to persons or damage to property.

Refer to the documentation for additional information. Observe section "Applicable documentation" (see page 9).

2.3 Target group

Any mechanical work may only be performed by adequately qualified personnel. Qualified personnel in this context are persons who are familiar with the setup, mechanical installation, trouble shooting and maintenance for this product. Further, they are qualified as follows:

- They are educated in the mechanics field (e.g. mechanical or mechatronic engineers) having successfully passed a final exam.
- They are familiar with these operating instructions.

Any electronic work may only be performed by adequately qualified electricians. Qualified electricians in this context are persons who are familiar with the electronic installation, startup, trouble shooting and maintenance for this product. Further, they are qualified as follows:

- They are educated in the electronics field (e.g. electronic or mechatronic engineers) having successfully passed a final exam.
- They are familiar with these operating instructions.

All work in further areas of transportation, storage, operation and waste disposal may only be carried out by persons who have been adequately trained.

2.4 Designated use

The gear units/gearmotors are intended for industrial systems and may only be used in accordance with the information provided in the technical documentation of SEW-EURODRIVE and the information given on the nameplate. They meet the requirements set forth in Directive 94/9/EC and comply with the applicable standards and regulations.

	NOTES ON EXPLOSION PROTECTION
	A drive motor connected to the gear unit is only allowed to be operated under the conditions described in section "Starting up gear units/gearmotors in potentially explosive atmospheres". Operate any gear unit connected to the motor on the frequency inverter only if the data on the gear unit nameplate is met! If a gear unit is operated in combination with a variable speed gear unit, the operating instructions of the variable speed gear unit must be handled separately. A motor mounted to a gear unit by means of an adapter or belt may only be operated if the data on the gear unit nameplate is met! There may be no aggressive substances in the vicinity that could damage the paint and seals.

2.5 Other applicable documentation

The following publications and documents have to be observed as well:

- Operating Instructions "Explosion-Proof AC Motors, Asynchronous Servomotors" for gearmotors and asynchronous servo gearmotors
- Operating Instructions "Explosion-Proof Synchronous Servomotors" for synchronous CFM and CMP servo gearmotors
- Operating instructions of installed options, if applicable
- "Gear Units" catalog or
- "Explosion-Proof Gear Units" catalog

2.6 Transport

Inspect the shipment immediately upon receipt for any damage that may have occurred during transportation. Inform the shipping company immediately. It may be necessary to preclude startup.

Tighten installed eyebolts. They are only intended for the weight of the motor/gearmotor; do not attach any additional loads.

The built-in lifting eyebolts comply with DIN 580. Always observe the loads and regulations listed in this standard. If the gearmotor is equipped with two suspension eye lugs or lifting eyebolts, then both of the suspension eye lugs should be used for transportation. In this case, the tension force vector of the slings must not exceed a 45° angle according to DIN 580.

Use suitable, sufficiently rated handling equipment if necessary. Remove any transportation fixtures prior to startup.

2.7 Extended storage

Observe the notes in section "Extended storage" (see page 133).

2.8 Installation/assembly

Observe the notes in section "Mechanical Installation" (see page 21)!

2.9 Startup/operation

Check the oil level before startup as described in chapter Inspection/Maintenance (see page 81).

Check that the direction of rotation is correct in **decoupled** status. Listen out for unusual grinding noises as the shaft rotates.

Secure keys for test mode without output elements. Do not deactivate monitoring and protection equipment even in test mode.

Switch off the gearmotor if in doubt whenever changes occur in relation to normal operation (e.g. increased temperature, noise, vibration). Determine the cause and contact SEW-EURODRIVE, if required.

2.10 Inspection/maintenance

Observe the notes in chapter "Inspection/Maintenance" (see page 81)!

3 Checklists

3.1 Before startup

This checklist includes all activities that will have to be executed **prior to startup** of a gear unit according to Directive 94/9/EC for operation in potentially explosive atmospheres.

Check prior to startup in potentially explosive atmospheres	Checked	Information in section ...
Inspect the shipment immediately upon receipt for any damage that may have occurred during transportation. Inform the shipping company immediately. Startup may have to be precluded. Remove transportation safety fixtures prior to startup.		2.6
Does the following information on the gear unit nameplate correspond with the permitted conditions for potentially explosive atmospheres on site: • Equipment group • Atex category • Atex zone • Temperature class • Maximum surface temperature		4.7 and 5.4
Have arrangements been made to prevent explosive atmospheres, oils, acids, gases, vapors or radiation during installation of the gear unit?		5.2
Is the ambient temperature maintained according to the lubricant table?		9.2
Have arrangements been made for sufficient ventilation and that there will be no external heat generation (e.g. via clutches)? The cooling air must not exceed a temperature of 40 °C.		5.3 and 5.4
Does the mounting position on the gear unit nameplate correspond to the indicated mounting position? Important: The mounting position may be changed only after prior consultation with SEW-EURODRIVE. ATEX approval will become void without prior consultation!		5.3 and 8.1
Does the oil level for the mounting position on the gear unit nameplate correspond to the indicated oil fill quantity?		5.3
Are all oil check and drain plugs as well as breather plugs and valves freely accessible?		5.3
Do all input and output elements to be installed have ATEX certification?		5.5
Have you checked that the data on the nameplate of the gear unit are not exceeded for standalone gear units with adapter or input shaft assembly?		6.2
When mounting gear units with hollow shaft and shrink disk: • Is the cover mounted properly?		5.8
When mounting the coupling of AM, AQA adapters: • You must not use distance bushings as an assembly tool!		5.11 and 5.12
When mounting a motor on the AD input shaft assembly: • Has the belt between input shaft end and motor shaft sufficient electrical leakage resistance < 10^9 Ω? • Before mounting a protection cover: Does a risk analysis performed by the manufacturer of the protection cover demonstrate that no sources of ignition can occur (such as impact sparks from grinding)?		5.14
For mains-operated motors: • Check that the data specified on the nameplate of the gear unit and the motor corresponds to the ambient conditions at the location where the drive is to be installed.		6.2
For inverter-operated gearmotors: Check that the gearmotor is approved for operation with an inverter • The parameter settings made for the inverter must prevent the gear unit from being overloaded (→ gear unit nameplate).		6.2

3.2 During startup

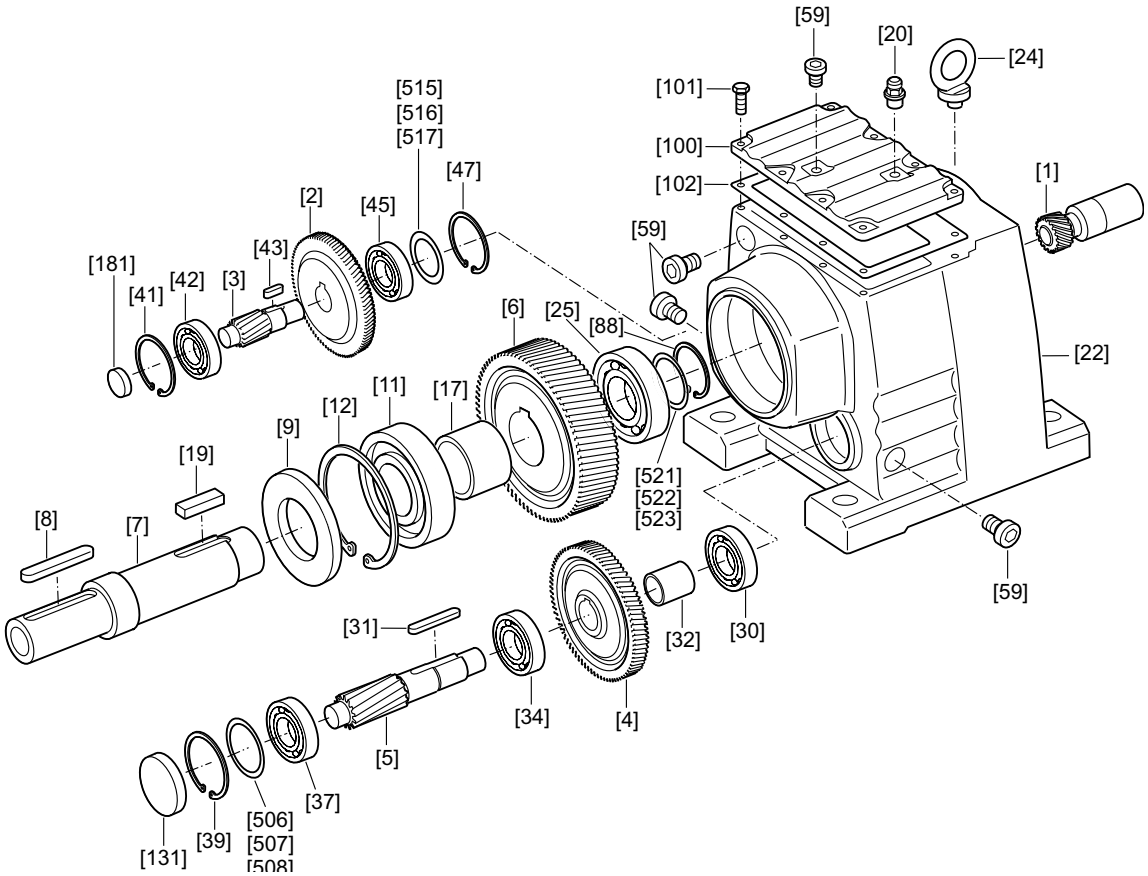
This checklist includes all activities that will have to be executed **during startup** of a gear unit according to Directive 94/9/EC for operation in potentially explosive atmospheres.

Check during startup in potentially explosive atmospheres	Checked	Information in section ...
Measure the surface temperature after three hours of operation. Do not exceed a temperature difference of 70 K compared to the ambient temperature. If the value is > 70 K, stop the drive immediately and contact SEW-EURODRIVE!		6.2
Measure the oil temperature. Add 10 K to the measured value. Determine lubricant change interval using this value.		6.2
Observe for gear units with AM adapter or AD input shaft assembly with RS backstop: • In rated operation, the lift-off speeds of the backstops must not drop below the minimum values.		5.11 and 5.12

4 Gear Unit Design

	NOTE
	The following figures are block diagrams. Their purpose is only to make it easier to assign components to the spare parts lists. Discrepancies may occur depending on the gear unit size and version!

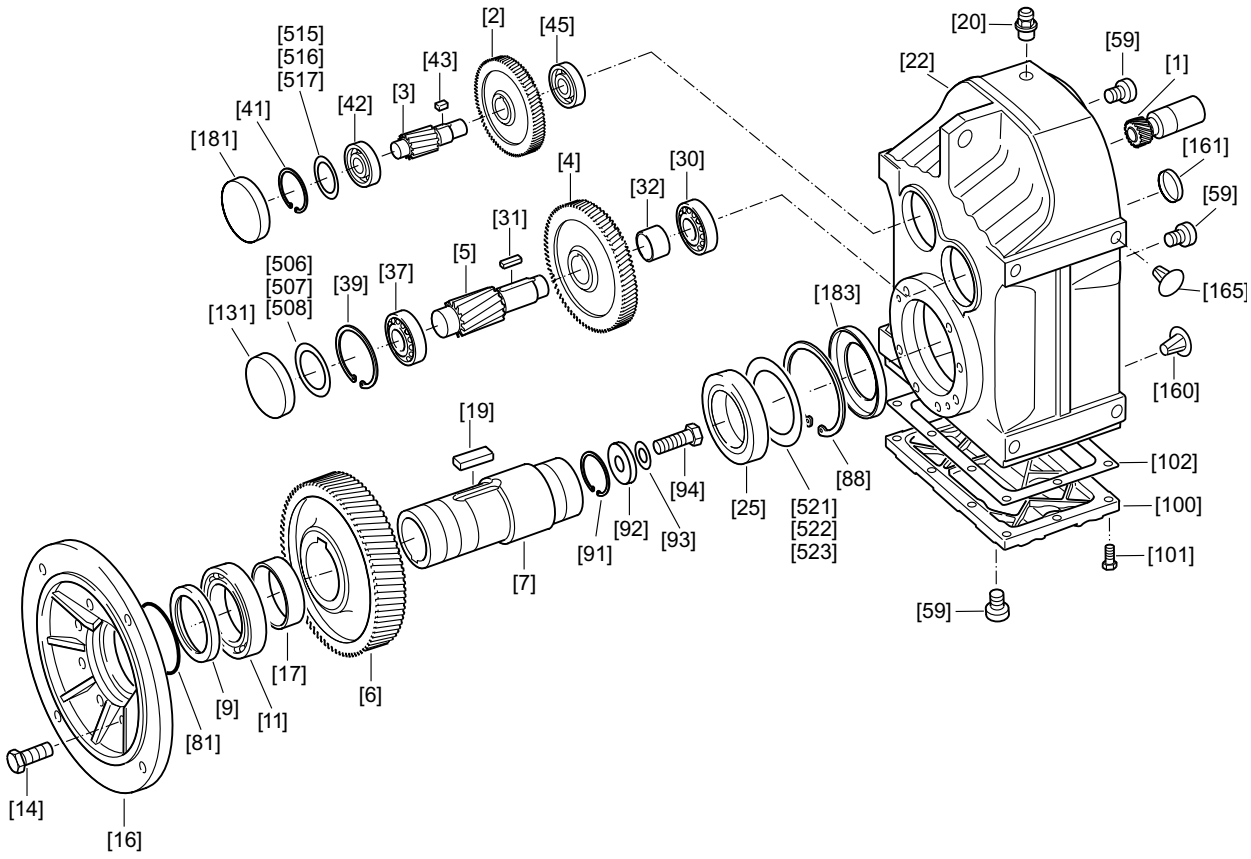
4.1 Basic design of helical gear units



19194251

[1] Pinion
[2] Gearwheel
[3] Pinion shaft
[4] Gearwheel
[5] Pinion shaft
[6] Gearwheel
[7] Output shaft
[8] Key
[9] Oil seal
[11] Roller bearing
[12] Circlip
[17] Spacer tube
[19] Key
[20] Breather valve
[22] Gear unit housing
[24] Lifting eyebolt
[25] Roller bearing
[30] Roller bearing
[31] Key
[32] Spacer tube
[34] Roller bearing
[37] Roller bearing
[39] Circlip
[41] Circlip
[42] Roller bearing
[43] Key
[45] Roller bearing
[47] Circlip
[59] Screw plug
[88] Circlip
[100] Gear cover plate
[101] Hex head screw
[102] Seal
[131] Closing cap
[181] Closing cap
[506] Shim
[507] Shim
[508] Shim
[515] Shim
[516] Shim
[517] Shim
[521] Shim
[522] Shim
[523] Shim

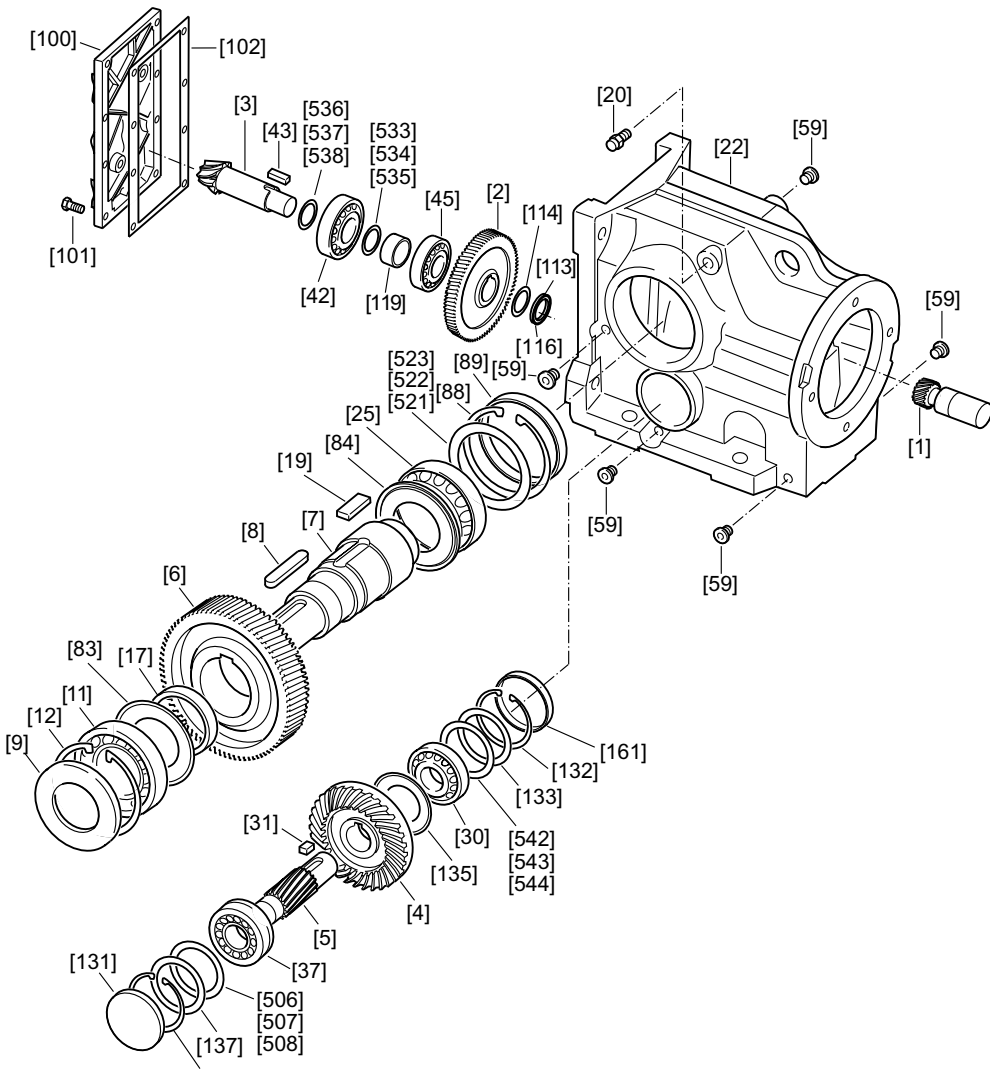
4.2 Basic design of parallel shaft helical gear units



19298059

[1]	Pinion	[22]	Gear unit housing	[91]	Circlip	[506]	Shim
[2]	Gearwheel	[25]	Roller bearing	[92]	Disc	[507]	Shim
[3]	Pinion shaft	[30]	Roller bearing	[93]	Lock washer	[508]	Shim
[4]	Gearwheel	[31]	Key	[94]	Hex head screw	[515]	Shim
[5]	Pinion shaft	[32]	Spacer tube	[100]	Gear cover plate	[516]	Shim
[6]	Gearwheel	[37]	Roller bearing	[101]	Hex head screw	[517]	Shim
[7]	Hollow shaft	[39]	Circlip	[102]	Seal	[521]	Shim
[9]	Oil seal	[41]	Circlip	[131]	Closing cap	[522]	Shim
[11]	Roller bearing	[42]	Roller bearing	[160]	Closing plug	[523]	Shim
[14]	Hex head screw	[43]	Key	[161]	Closing cap		
[16]	output flange	[45]	Roller bearing	[165]	Closing plug		
[17]	Spacer tube	[59]	Screw plug	[181]	Closing cap		
[19]	Key	[81]	Nilos ring	[183]	Oil seal		
[20]	Breather valve	[88]	Circlip				

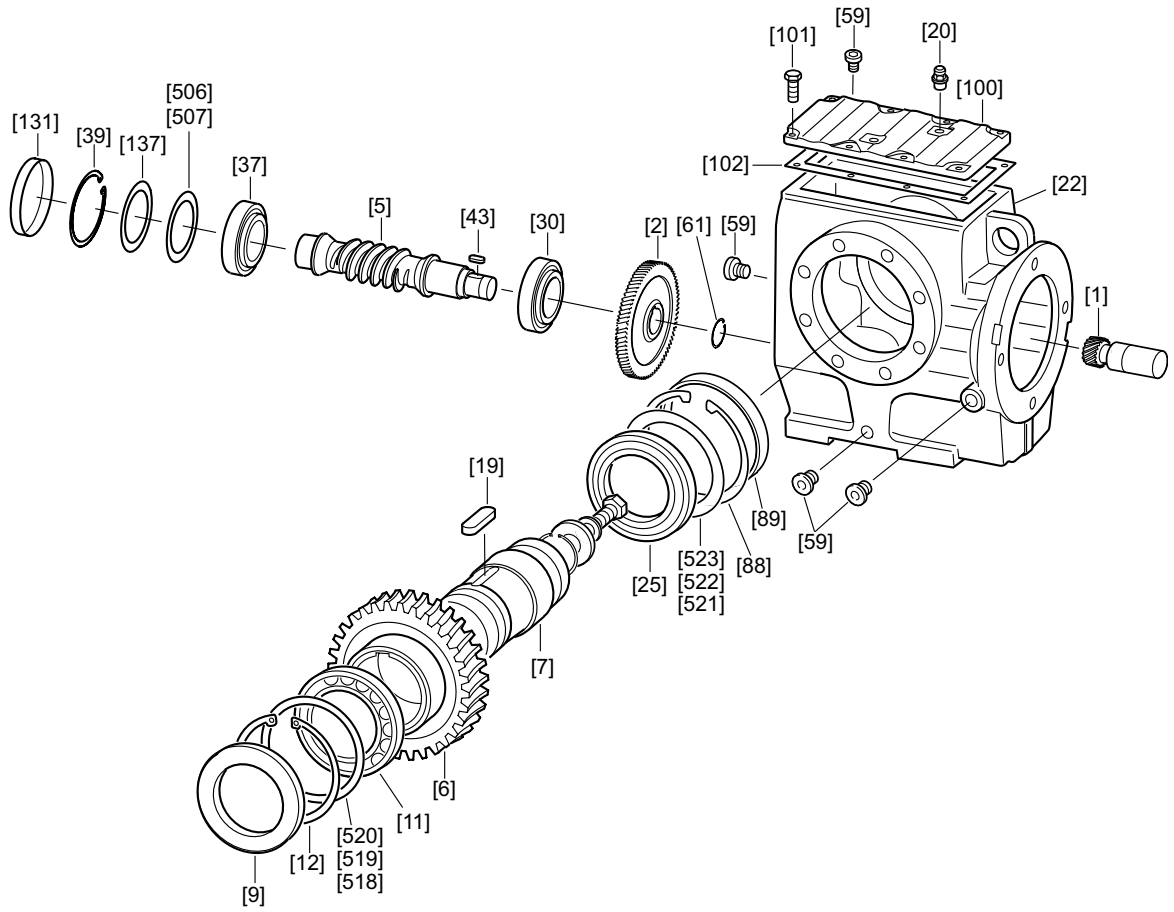
4.3 Basic design of helical-bevel gear units



19301131

[1]	Pinion	[25]	Roller bearing	[102]	Seal	[522]	Shim
[2]	Gearwheel	[30]	Roller bearing	[113]	Slotted nut	[523]	Shim
[3]	Pinion shaft	[31]	Key	[114]	Multi-tang washer	[533]	Shim
[4]	Gearwheel	[37]	Roller bearing	[116]	Thread locker	[534]	Shim
[5]	Pinion shaft	[39]	Circlip	[119]	Spacer tube	[535]	Shim
[6]	Gearwheel	[42]	Roller bearing	[131]	Closing cap	[536]	Shim
[7]	Output shaft	[43]	Key	[132]	Circlip	[537]	Shim
[8]	Key	[45]	Roller bearing	[133]	Supporting ring	[538]	Shim
[9]	Oil seal	[59]	Screw plug	[135]	Nilos ring	[542]	Shim
[11]	Roller bearing	[83]	Nilos ring	[161]	Closing cap	[543]	Shim
[12]	Circlip	[84]	Nilos ring	[506]	Shim	[544]	Shim
[17]	Spacer tube	[88]	Circlip	[507]	Shim		
[19]	Key	[89]	Closing cap	[508]	Shim		
[20]	Breather valve	[100]	Gear cover plate	[521]	Shim		
[22]	Gear unit housing	[101]	Hex head screw	[521]	Shim		

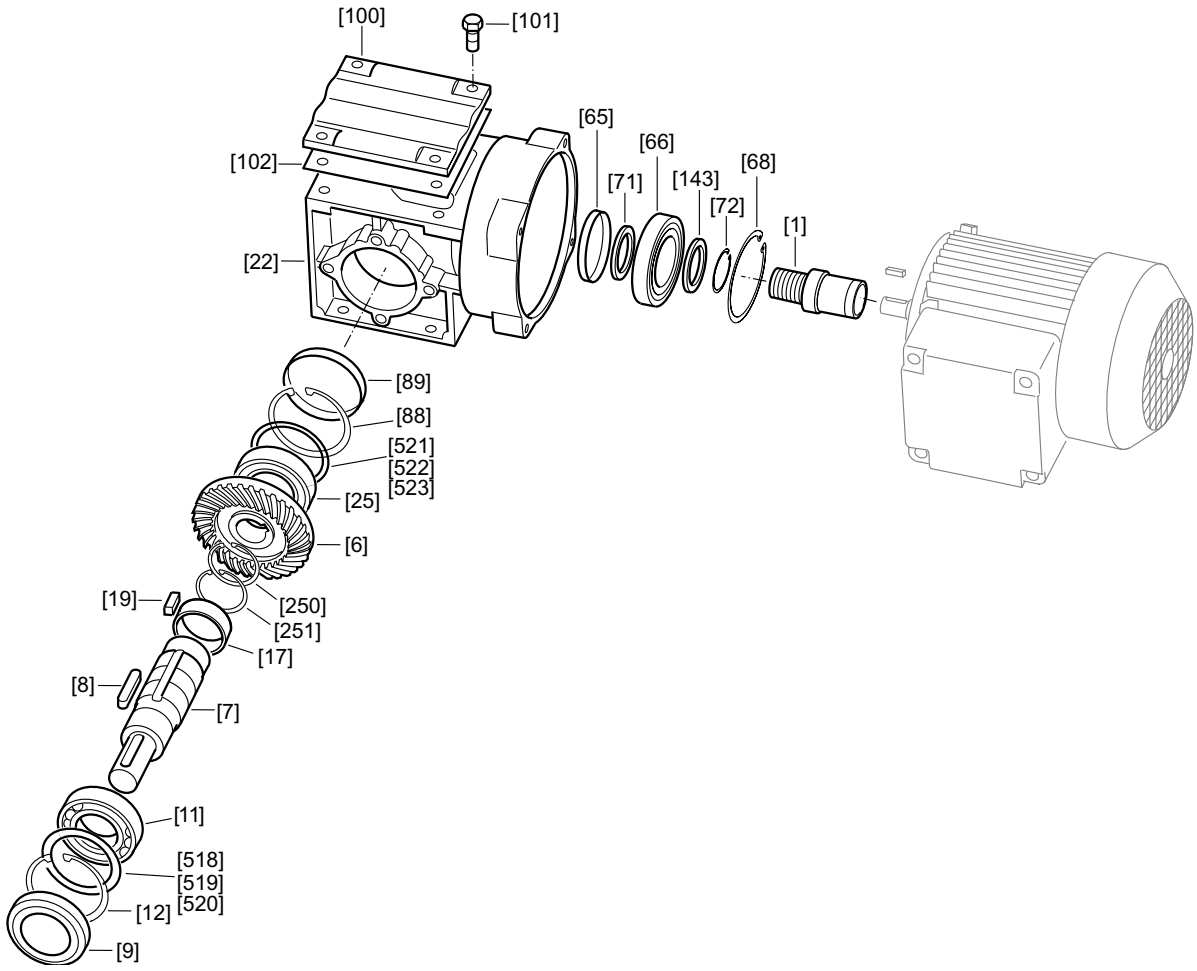
4.4 Basic design of helical-worm gear units



19304203

[1]	Pinion	[20]	Breather valve	[88]	Circlip	[518]	Shim
[2]	Gearwheel	[22]	Gear unit housing	[89]	Closing cap	[519]	Shim
[5]	Worm	[25]	Roller bearing	[100]	Gear cover plate	[520]	Shim
[6]	Worm gear	[30]	Roller bearing	[101]	Hex head screw	[521]	Shim
[7]	Output shaft	[37]	Roller bearing	[102]	Seal	[522]	Shim
[9]	Oil seal	[39]	Circlip	[131]	Closing cap	[523]	Shim
[11]	Roller bearing	[43]	Key	[137]	Supporting ring		
[12]	Circlip	[59]	Screw plug	[506]	Shim		
[19]	Key	[61]	Circlip	[507]	Shim		

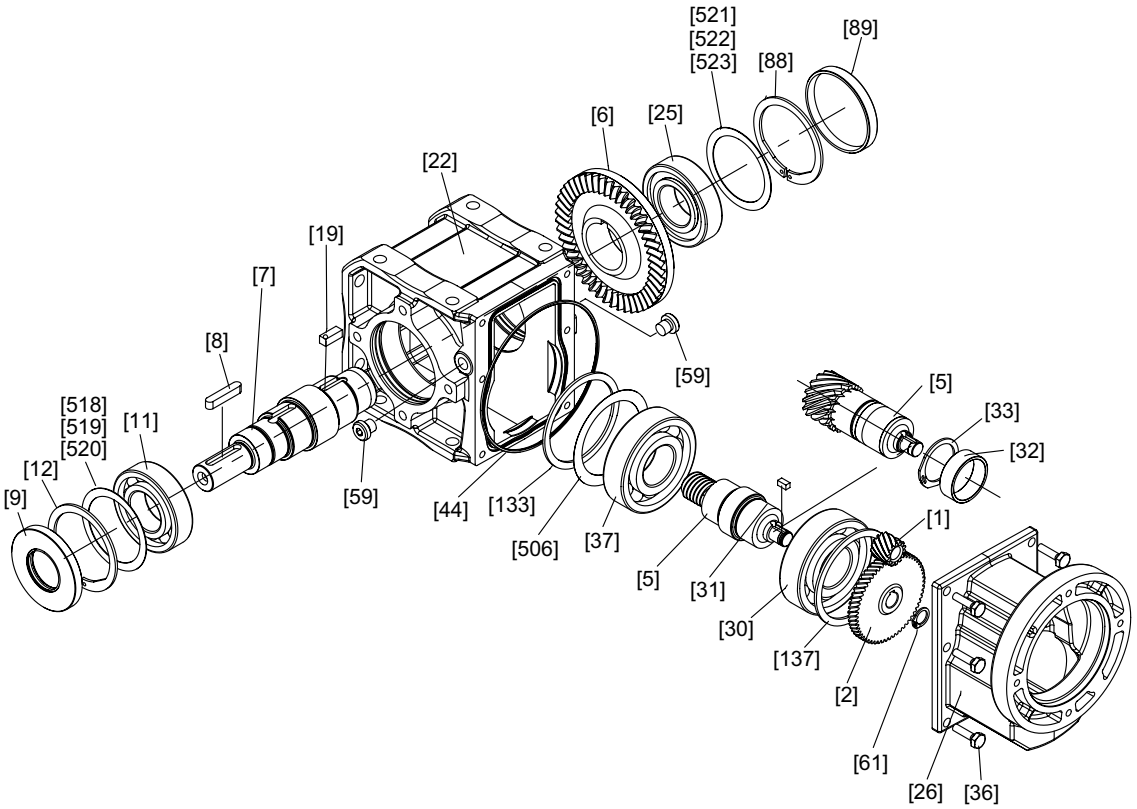
4.5 Basic design of SPIROPLAN® W10-W30 gear units



19307275

[1]	Pinion	[19]	Key	[88]	Circlip	[251]	Circlip
[6]	Gearwheel	[22]	Gear unit housing	[89]	Closing cap	[518]	Shim
[7]	Output shaft	[25]	Roller bearing	[100]	Gear cover plate	[519]	Shim
[8]	Key	[65]	Oil seal	[101]	Hex head screw	[520]	Shim
[9]	Oil seal	[66]	Roller bearing	[102]	Seal	[521]	Shim
[11]	Roller bearing	[71]	Supporting ring	[132]	Circlip	[522]	Shim
[12]	Circlip	[72]	Circlip	[183]	Oil seal	[523]	Shim
[17]	Spacer tube	[143]	Supporting ring	[250]	Circlip		

4.6 Basic design of SPIROPLAN® W37 gear units

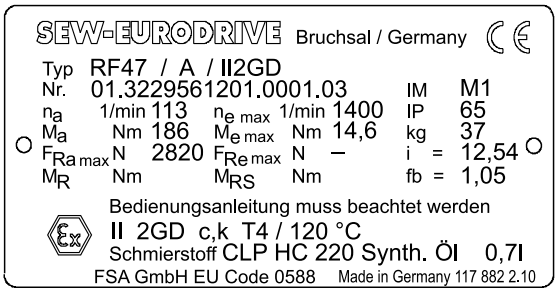


605872395

[1]	Pinion	[22]	Gear unit housing	[44]	O-ring	[137]	Shim
[2]	Gearwheel	[24]	Eyebolt	[59]	Screw plug	[150]	Hexagonal nut
[5]	Pinion shaft	[25]	Deep groove ball bearing	[61]	Circlip	[183]	Oil seal
[6]	Gearwheel	[26]	Housing stage 1	[68]	Circlip	[506]	Shim
[7]	Output shaft	[30]	Deep groove ball bearing	[72]	Circlip	[518]	Shim
[8]	Key	[31]	Key	[80]	Key	[519]	Shim
[9]	Oil seal	[32]	Spacer tube	[88]	Circlip	[520]	Shim
[11]	Deep groove ball bearing	[33]	Circlip	[89]	Closing cap	[521]	Shim
[12]	Circlip	[36]	Hex head screw	[106]	Stud	[522]	Shim
[19]	Key	[37]	Deep groove ball bearing	[133]	Shim	[523]	Shim

4.7 Nameplate/unit designation

4.7.1 Nameplate


SEW-EURODRIVE Bruchsal / Germany
Typ RF47 / A / II2GD
Nr. 01.3229561201.0001.03
IM M1
na 1/min 113
ne max 1/min 1400
IP 65
Ma Nm 186
Me max Nm 14,6
kg 37
FRa max N 2820
FRe max N –
i = 12,54
MR Nm
MRS Nm
fb = 1,05
Bedienungsanleitung muss beachtet werden
II 2GD c,k T4 / 120 °C
Schmierstoff CLP HC 220 Synth. ÖI 0,7I
FSA GmbH EU Code 0588 Made in Germany 117 882 2.10

210927627

f_b		= Service factor
$F_{Ra\ max}$	[N]	= Maximum overhung load on the output side
$F_{Re\ max}$	[N]	= Maximum overhung load on the input side (with input shaft assembly AD)
i		= Gear unit reduction ratio
IM		= Mounting position
IP..		= Enclosure
$n_{e\ max}$	[rpm]	= maximum input speed
n_a	[rpm]	= output speed
M_{emax}	[Nm]	= maximum input torque
M_a	[Nm]	= Output torque
M_R	[Nm]	= Overload torque when using an AR adapter
M_{RS}	[Nm]	= Locking torque of the backstop

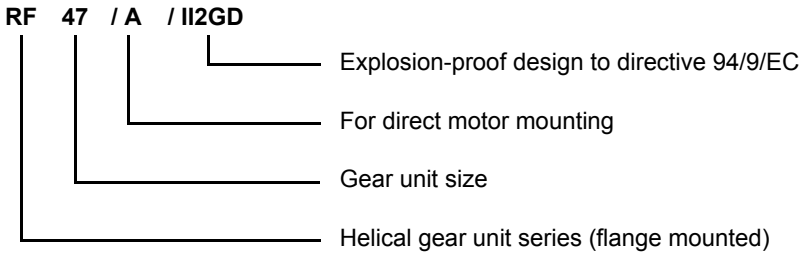
Information on the special indication

	NOTE ON EXPLOSION PROTECTION
	In some cases SEW gear units/gearmotors must only be operated in compliance with special measures. For these cases, there is a special indication on the nameplate **"II..X"**. These special measures may be necessary due to various reasons (e.g. intermittent operation only, reduced output torque, etc.). The customer has been informed about the required special measures on the initial distribution of the gear unit/gearmotor. The customer is obliged to ensure the compliance with these special measures.

4.7.2 Unit designation

	NOTE
	For a detailed overview of unit designations and additional information, refer to the following publications: • "Gear Units" catalog • "Gearmotors" catalog • "Explosion-proof drives" catalog

Example: Helical gear unit, category II2GD


RF 47 / A / II2GD
Explosion-proof design to directive 94/9/EC
For direct motor mounting
Gear unit size
Helical gear unit series (flange mounted)

5 Mechanical Installation

5.1 Required tools/resources

- Set of wrenches
- Torque wrench for:
  - Shrink disks
  - AQH motor adapter
  - Input shaft assembly with centering shoulder
- Mounting device
- Compensation elements (shims, spacing rings)
- Fasteners for input and output elements
- Lubricant (e.g. NOCO® Fluid)
- Bolt locking compound (for input shaft assembly with centering shoulder), e.g. Loctite® 243
- Standard parts are not included in the delivery

5.1.1 Installation tolerances

Shaft end	Flanges
Diameter tolerance in accordance with DIN 748 • ISO k6 for solid shafts with ∅ ≤ 50 mm • ISO m6 for solid shafts with ∅ > 50 mm • ISO H7 for hollow shafts • Center bore in accordance with DIN 332, shape DR	Centering shoulder tolerance to DIN 42948 • ISO j6 for $b_1 \leq 230$ mm • ISO h6 with $b_1 > 230$ mm

5.2 Prerequisites for assembly

CAUTION!

Improper assembly may result in damages to the gear unit/gearmotor.

Potential damage to property!

- Do closely observe the notes in this chapter.

Ensure that the following conditions have been met:

- The entries on the nameplate of the gearmotor match the voltage supply system.
- The drive has not been damaged during transportation or storage.
- Ensure that the following requirements have been met:

  For standard gear units:

  – Ambient temperature according to the technical documentation, nameplate and lubricant table in section "Lubricants" (see page 134).

  – No harmful oils, acids, gases, vapors, radiation etc. in the vicinity

  For special versions:

  – The drive is designed in accordance with the ambient conditions. Refer to the information on the nameplate.

  For helical-worm/**SPIROPLAN® W gear units:**

  – No large external mass moments of inertia which could exert a retrodriving load on the gear unit.

    [for η' (retrodriving) = 2 – 1/η < 0.5 self-locking]
- You must clean the output shafts and flange surfaces thoroughly to ensure they are free of anti-corrosion agents, contamination or similar. Use a standard solvent. Do not expose the sealing lips of the oil seals to the solvent – damage to the material!
- When the drive is installed in abrasive ambient conditions, protect the output end oil seals against wear.

5.3 Installing the gear unit

The gear unit or gearmotor is only allowed to be installed in the specified mounting position. Refer to the information on the nameplate. The SPIROPLAN® gearmotors are not dependent on the mounting position, except for W37 in M4 mounting position.

The support structure must have the following characteristics:

- Level
- Vibration damping
- Torsionally rigid

The Maximum permitted flatness error for foot and flange mounting (guide values with reference to DIN ISO 1101):

- Gear unit size ≤ 67: max. 0.4 mm
- Gear unit size 77 ... 107: max. 0.5 mm
- Gear unit size 137 ... 147: max. 0.7 mm
- Gear unit size 157 ... 187: max. 0.8 mm

Do not tighten the housing legs and mounting flanges against one another and ensure that you comply with the permitted overhung and axial loads!

Secure gearmotors using quality 8.8 screws.

Secure the following gearmotors using quality 10.9 screws:

- RF37, R37F with flange ∅ 120 mm
- RF47, R47F with flange ∅ 140 mm
- RF57, R57F with flange ∅ 160 mm
- and RZ37, RZ47, RZ57, RZ67, RZ77, RZ87

	NOTES ON EXPLOSION PROTECTION
	• The plugs for checking and draining oil and the breather valves must be freely accessible. • Processes that cause strong electrical charge due to fast moving particles on the coating must be excluded. • Prior to startup, check that the oil level is as specified for the mounting position! see section "Lubricants" (see page 134), or data on nameplate.

Check that the oil level is as specified for the mounting position. see section "Lubricants" (see page 134), or data on nameplate. The gear units are filled with the required oil volume at the factory. There may be slight deviations at the oil level plug as a result of the mounting position, which are permitted within the manufacturing tolerances.

Adjust the lubricant fill volumes and the position of the breather valve accordingly in the event of a change of mounting position.

Consult the SEW customer service if you intend to change the mounting position of K gear units to or between M5 and M6.

Consult the SEW customer service if you intend to change the mounting position of S gear units sizes S47 ... S97, to M2 and M3.

	NOTE ON EXPLOSION PROTECTION
	The mounting position may be changed only after prior consultation with SEW-EURODRIVE. ATEX approval will become void without prior consultation!

In case there is a risk of electrochemical corrosion between the gear unit and the driven machine, use plastic inserts that are 2 to 3 mm thick. The material used must have an electrical leakage resistance < $10^9\Omega$. Electrochemical corrosion can occur between various metals, for example, cast iron and high-grade steel. Also fit the bolts with plastic washers!

	NOTE ON EXPLOSION PROTECTION
	Always ground the gear unit housing additionally.

5.3.1 Tightening torques for retaining screws

Mount the gearmotors with the following tightening torques:

Screw/nut	Tightening torque screw/nut Strength class 8.8 [Nm]
M6	11
M8	25
M10	48
M12	86
M16	210
M20	410
M24	710
M30	1450
M36	2500
M42	4600
M48	6950
M56	11100

Mount the helical gearmotors in flange-mounted design with the following increased tightening torques:

Flange	Gear unit	Screw/nut	Tightening torque screw/nut Strength class 10.9 [Nm]
120	RF37	M6	14
140	RF47	M8	35
160	RF57	M8	35
60ZR	RZ37	M8	35
70ZR	RZ47	M8	35
80ZR	RZ57	M10	69
95ZR	RZ67	M10	69
110ZR	RZ77	M12	120
130ZR	RZ87	M12	120

5.3.2 Mounting the gear units

Foot-mounted gear unit

The following table shows the thread sizes of the gear units in foot-mounted design depending on the gear unit type and size:

Screw	Gear unit type					
	R / R..F	RX	F / FH..B / FA..B	K / KH..B / KV..B / KA..B	S	W
M6	07					10/20
M8	17/27/37		27/37		37	30/37
M10		57	47	37/47	47/57	
M12	47/57/67	67	57/67	57/67	67	
M16	77/87	77/87	77/87	77	77	
M20	97	97/107	97	87	87	
M24	107		107	97	97	
M30	137		127	107/167		
M36	147/167		157	127/157/187		

Gear unit with B14 flange and/or hollow shaft

The following table shows the thread sizes of the gear units with B14 flange and/or hollow shaft depending on the gear unit type and size:

Screw	Gear unit type				
	RZ	FAZ / FHZ	KAZ / KHZ / KVZ	SA / SAZ / SHZ	WA
M6	07/17/27			37	10/20/30
M8	37/47	27/37/47	37/47	47/57	37
M10	57/67				
M12	77/87	57/67/77	57/67/77	67/77	
M16		87/97	87/97	87/97	
M20		107/127	107/127		
M24		157	157		

Gear unit with B5 flange

The following table shows the thread sizes of the gear units with B5 flange depending on the gear unit type,size and flange diameter:

∅ - Flange [mm]	Screw	Gear unit type				
		RF / R..F / RM	FF / FAF / FHF	KF / KAF / KHF / KVF	SF / SAF /SHF	WF / WAF
80	M6					10
110	M8					20
120	M6	07/17/27			37	10/20/30/37
140	M8	07/17/27				
160	M8	07/17/27/37/47	27/37	37	37/47	30/37
200	M10	37/47/57/67	47	47	57/67	
250	M12	57/67/77/87	57/67	57/67	77	
300	M12	67/77/87	77	77		
350	M16	77/87/97/107	87	87	87	
450	M16	97/107/137/147	97/107	97/107	97	
550	M16	107/137/147/167	127	127		
660	M20	147/167	157	157		

5.3.3 Installation in damp locations or in the open

Drives are supplied in corrosion-resistant versions with an according surface protection coating for use in damp areas or outdoors. Repair any damage to the paint work (e.g. on the breather valve or the eyebolts).

When mounting the motors onto AM, AQ, AR, AT adapters, seal the flange areas with a suitable sealing compound, e.g. Loctite® 574.

5.3.4 Breather

No breather plug is required for the following gear units:

- R07 in mounting positions M1, M2, M3, M5 and M6
- R17, R27 and F27 in mounting positions M1, M3, M5 and M6
- SPIROPLAN® W10, W20, W30 gear units
- SPIROPLAN® W37 gear units in mounting positions M1, M2, M3, M5, M6

SEW-EURODRIVE supplies all other gear units with the breather valve installed and activated according to the particular mounting position.

Exceptions:

1. SEW supplies the following gear units with a screw plug on the vent hole provided:
   - Pivoted mounting positions, if possible
   - Gear units for mounting on a slant

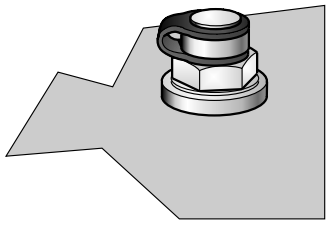
   The breather valve is located in the motor terminal box. Before startup, you must replace the highest screw plug with the provided breather valve.
2. SEW supplies a breather valve in a plastic bag for **gear head units** requiring venting on the input end.
3. **Enclosed gear units** are supplied without a breather valve.

	NOTE ON EXPLOSION PROTECTION
	The assembly of **gear head units** with motors or adapters may be performed by authorized personnel only. Please consult SEW-EURODRIVE.

Activating the breather valve

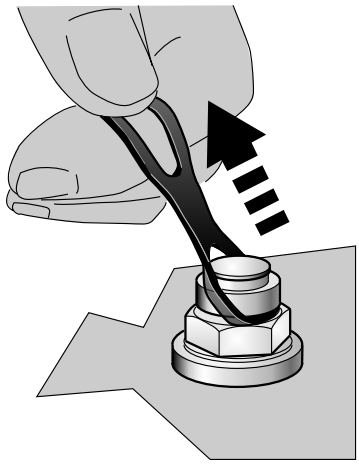
Check whether the breather valve is activated. If the breather valve has not been activated, you must remove the transport fixture from the breather valve before starting up the gear unit!

1. Breather valve with transport fixture



211319051

2. Removing the transport fixture



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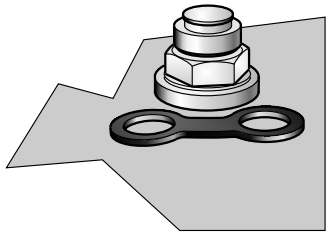
3. Activated breather valve



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5.3.5 Painting the gear unit

CAUTION!

Breather valves and oil seals may be damaged during the painting or re-painting process.

Potential damage to property.

- Thoroughly cover the breather valves and the sealing lip of the oil seals with strips prior to the painting process.
- Remove the strips after the process.

5.4 Gear units with solid shaft

5.4.1 Notes on installation

NOTE ON EXPLOSION PROTECTION

Use only input and output elements with ATEX approval, if these are subject to Directive 94/9/EC.

- Only use a mounting device for installing input and output elements. Use the center bore and the thread on the shaft end for positioning.

NOTE ON EXPLOSION PROTECTION

Use belts with sufficient electrical bleeder resistance < 10^9 W only.

- These have to meet the requirements set forth in IEC 60695-11-10, category FV-0.
- Power transmission elements should be balanced after fitting and must not give rise to any impermissible radial or axial forces (see the "Gearmotors" or "Explosion-Proof Drives" catalog for permitted values).

NOTE

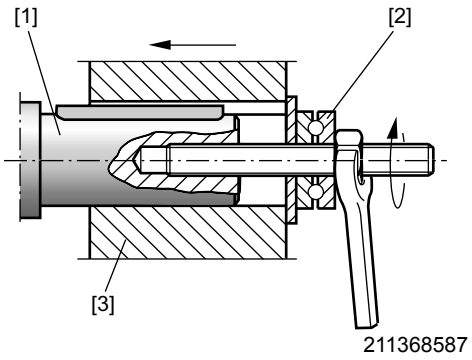
Mounting is easier if you first apply lubricant to the output element or heat it up briefly (to 80 ... 100 °C).

5.4.2 Assembling the input and output components

	CAUTION! Bearing, hosing or shaft may be damaged due to improper assembly. Potential damage to property! • Only assemble the input and output components with a mounting device. Use the center bore and the thread on the shaft end for positioning. • Never force belt pulleys, couplings, pinions, etc. onto the shaft end by hitting them with a hammer. • In the case of belt pulleys, make sure the belt is tensioned correctly in accordance with the manufacturer's instructions. • Power transmission elements should be balanced after fitting and must not give rise to any impermissible radial or axial forces (see the "Gearmotors" or "Explosion-Proof Drives" catalog for permitted values).

Assembly with mounting device

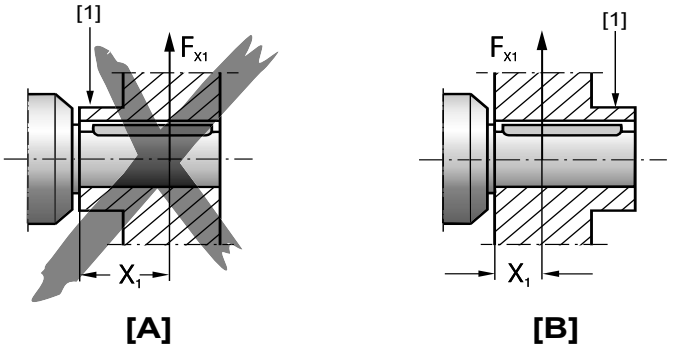
The following figure shows a mounting device for installing couplings or hubs on gear unit or motor shaft ends. Should you be able to tighten the screw without any problems, you may not need the thrust bearing on the mounting device.



[1] Gear shaft end
[2] Thrust bearing
[3] Coupling hub

Avoid excessive overhung loads

Avoid high overhung loads by: Installing the gear or chain sprocket according to figure **B** if possible.



[1] Hub
[A] unfavorable
[B] correct

	NOTE
	Mounting is easier if you first apply lubricant to the output element or heat it up briefly (to 80 ... 100 °C).

5.4.3 Assembling the couplings

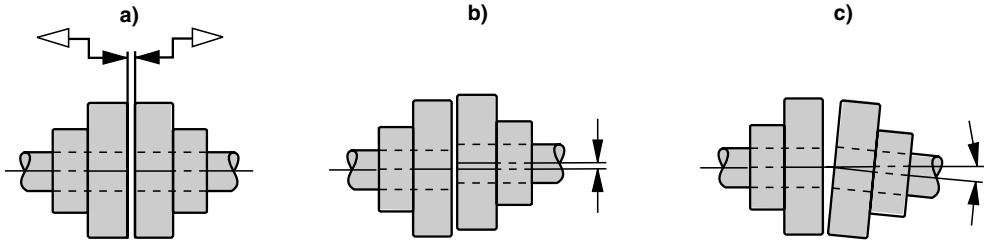
	⚠ CAUTION!
	Input and output elements such as belt pulleys, couplings etc. are in fast motion during operation. Risk of jamming and crushing. • Cover input and output elements with a touch guard.

Adjust the following misalignments according to the coupling manufacturer's specifications when mounting couplings.

a) Maximum and minimum clearance

b) Axial offset

c) Angular offset



5.5 Gear units and gearmotors in category II2GD

	NOTES ON EXPLOSION PROTECTION
	• Explosion-proof gear units and gearmotors in R, F, K, W and S series comply with the design requirements for unit group II, categories 2G (potentially explosive gas atmosphere) and 2D (potentially explosive dust atmosphere). These units are intended for use in zones 1 and 21. • The explosion-proof R, F, K, and S series gear units with AR adapter (adapter with torque limiting coupling) comply with equipment group II, category 3G (potentially explosive gas atmosphere) and 3D (potentially explosive dust atmosphere). These units are intended for use in zones 2 and 22. • Do not operate gear units and gearmotors in W10.. series in a potentially explosive atmosphere.

5.5.1 Ambient temperature

All gearmotors in category II2D are only allowed to be used at ambient temperatures from -20 °C to +40 °C.

	NOTE ON EXPLOSION PROTECTION
	Any ambient temperatures deviating from this range have to be listed on the nameplate.

5.5.2 Temperature class

Mains-operated gear units gearmotors in category II2G (potentially explosive gas atmosphere) are approved for temperature classes T3 to T6 depending on their speed, reduction ratio and mounting position. The temperature class of the gear unit is indicated on the nameplate. The situation for single gear units and inverter-operated gearmotors (only 4 and 6 pole) is defined depending on the application, subject to consultation with SEW-EURODRIVE.

5.5.3 Surface temperature

The maximum surface temperature of category II2D units is 120 °C or 140 °C depending on the speed, gear ratio, and mounting position. Lower surface temperature limits are only permitted after consultation with SEW-EURODRIVE and must be indicated on the nameplate. The system operator must guarantee that a possible accumulation of dust will not exceed a maximum thickness of 5 mm, in accordance with EN 50281-1-2.

5.5.4 Degree of protection

The degree of protection for all gear unit versions is IP65 according to EN 60529.

5.5.5 Ambient conditions

Provide sufficient ventilation for the gear units and prevent external heat generation (e.g. via couplings).

5.5.6 Output power and output torque

Observe the output torque and the permitted overhung load requirements.

5.5.7 Special designs

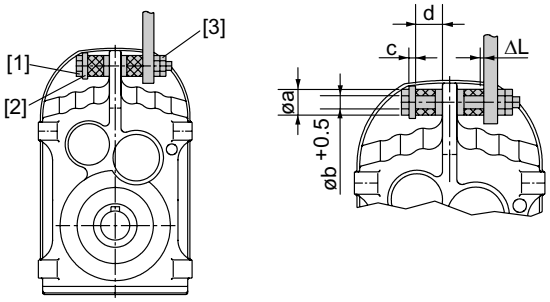
Special designs (e.g. modified output shaft) may only be operated in potentially explosive atmospheres after prior approval by SEW-EURODRIVE.

5.6 Torque arms for shaft-mounted gear units

	CAUTION!
	Improper assembling may result in damages to the gear unit. Potential damage to property! • Do not place torque arms under strain during installation. • Use bolts of quality 8.8 to fasten torque arms.

5.6.1 Parallel shaft helical gear units

The following figure shows the toque arm for parallel shaft helical gear units.



211366411

[1] Screw
[2] Washer
[3] Nut

Proceed as follows to mount the rubber buffers:

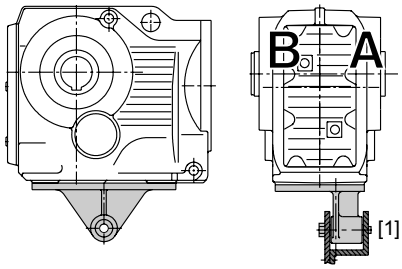
1. Use screws [1] and washers according to the following table.
2. Use two nuts to secure the screw connection [3].
3. Tighten the screw until the initial stress "Δ L" of the buffers is reached according to the table.

Gear unit	rubber buffer			Washer width	Δ L (taut)
	Diameter	Internal diameter	Length (loose)		
	a [mm]	b [mm]	c [mm]	d [mm]	[mm]
FA27	40	12.5	20	5	1
FA37	40	12.5	20	5	1
FA47	40	12.5	20	5	1.5
FA57	40	12.5	20	5	1.5
FA67	40	12.5	20	5	1.5
FA77	60	21.0	30	10	1.5
FA87	60	21.0	30	10	1.5
FA97	80	25.0	40	12	2
FA107	80	25.0	40	12	2
FA127	100	32.0	60	15	3
FA157	120	32.0	60	15	3

5.6.2 Helical-bevel gear units

The following figure shows the toque arm for helical-bevel gear units.

- Bushing [1] with bearings on both ends.
- Install connection end B as a mirror image of A.



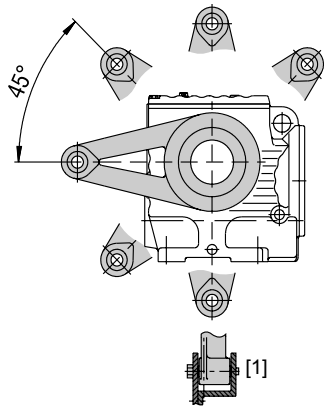
211362059

Gear unit	Screws	Tightening torque
KA37	4 × M10 × 25 – 8.8	48 Nm
KA47	4 × M10 × 30 – 8.8	48 Nm
KA67	4 × M12 × 35 – 8.8	86 Nm
KA77	4 × M16 × 40 – 8.8	210 Nm
KA87	4 × M16 × 45 – 8.8	210 Nm
KA97	4 × M20 × 50 – 8.8	410 Nm
KA107	4 × M24 × 60 – 8.8	710 Nm
KA127	4 × M36 × 130 – 8.8	2500 Nm
KA157	4 × M36 × 130 – 8.8	2500 Nm

5.6.3 Helical worm gear units

The following figure shows the toque arm for helical-worm gear units.

- Bushing [1] with bearings on both ends.



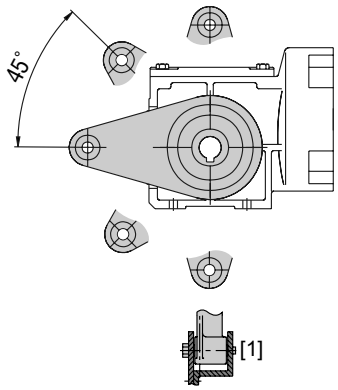
211491723

Gear unit	Screws	Tightening torque
SA37	4 x M6 × 16 – 8.8	11 Nm
SA47	4 x M8 × 20 – 8.8	25 Nm
SA57	6 x M8 × 20 – 8.8	25 Nm
SA67	8 x M12 × 25 – 8.8	86 Nm
SA77	8 x M12 × 35 – 8.8	86 Nm
SA87	8 x M16 × 35 – 8.8	210 Nm
SA97	8 x M16 × 35 – 8.8	210 Nm

5.6.4 SPIROPLAN® W gear units

The following figure shows the toque arm for SPIROPLAN® W gear units.

- Bushing [1] with bearings on both ends.



211489547

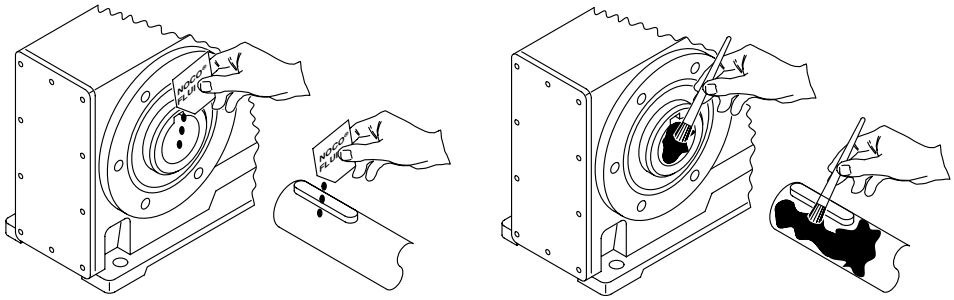
Gear unit	Screws	Tightening torque
WA10	4 x M6 × 16	11 Nm
WA20	4 x M6 × 16	11 Nm
WA30	4 x M6 × 16	11 Nm
WA37	4 x M8 × 20	25 Nm

5.7 Shaft-mounted gear unit with keyway or splined hollow shaft

	NOTE
	Concerning the configuration of the customer shaft, please also refer to the design notes in the Gearmotors catalog!

5.7.1 Installation notes

1. Apply and thoroughly spread NOCO® Fluid



211516171

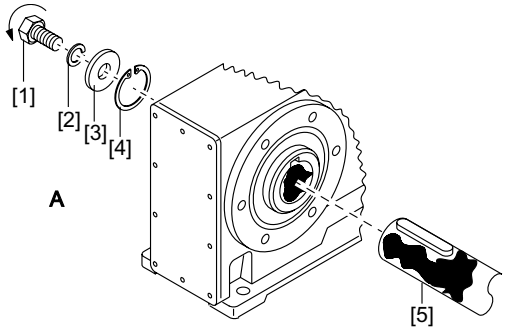
2. Install the shaft and secure it axially

   (mounting is facilitated by using a mounting device)

   The three mounting types are described below:

   - 2A: standard scope of delivery
   - 2B: installation and removal kit for customer shaft with contact shoulder
   - 2C: installation and removal kit for customer shaft without contact shoulder

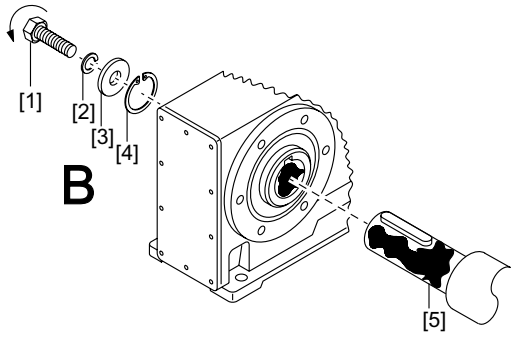
2A: Installation with standard scope of delivery



211518347

[1] Short retaining screw (standard delivery scope)
[2] Lock washer
[3] Washer
[4] Circlip
[5] Customer shaft

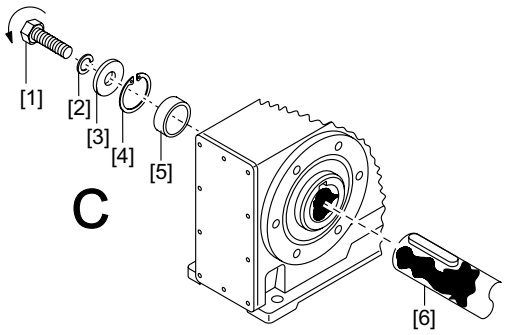
2B: Installation with SEW-EURODRIVE installation and removal kit (see page 42) – customer shaft **with** contact shoulder



211520523

[1] Retaining screw
[2] Lock washer
[3] Washer
[4] Circlip
[5] Customer shaft with contact shoulder

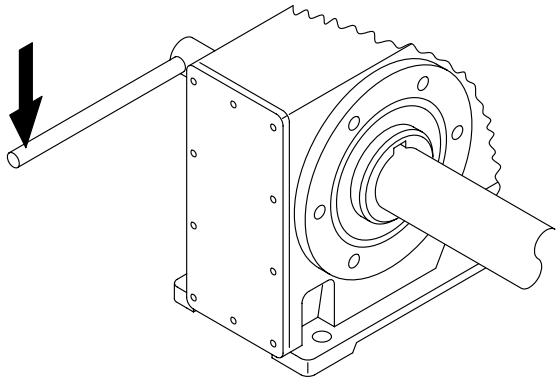
2C: Installation with SEW-EURODRIVE installation and removal kit (see page 42) – customer shaft **without** contact shoulder



211522699

[1] Retaining screw
[2] Lock washer
[3] Washer
[4] Circlip
[5] Spacer tube
[6] Customer shaft without contact shoulder

3. Tighten the retaining screw to the appropriate torque (see table).



211524875

Screw	Tightening torque [Nm]
M5	5
M6	8
M10/12	20
M16	40
M20	80
M24	200

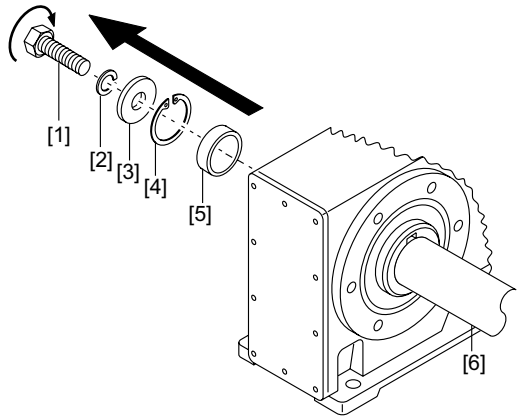
NOTE

In addition, to avoid contact corrosion, we recommend that you recess the customer shaft between the two contact surfaces!

5.7.2 Removal notes

This description is only applicable when the gear unit was assembled using the installation and removal kit (see page 42) from SEW-EURODRIVE. Observe section "Installation notes" (see page 37), 2B or 2C.

1. Loosen the retaining screw [1].
2. Remove parts [2] to [4] and, if applicable, the distance piece [5].

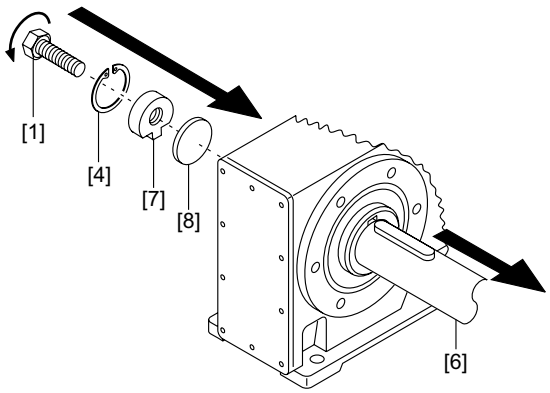


211527051

[1] Retaining screw
[2] Lock washer
[3] Washer
[4] Circlip
[5] Spacer tube
[6] Customer shaft

3. Insert the forcing disc [8] and the fixed nut [7] from the SEW-EURODRIVE installation/removal kit between the customer shaft [6] and the circlip [4].
4. Re-install the circlip [4].

5. Screw the retaining screw [1] back in. Now you can force the gear unit off the shaft by tightening the bolt.

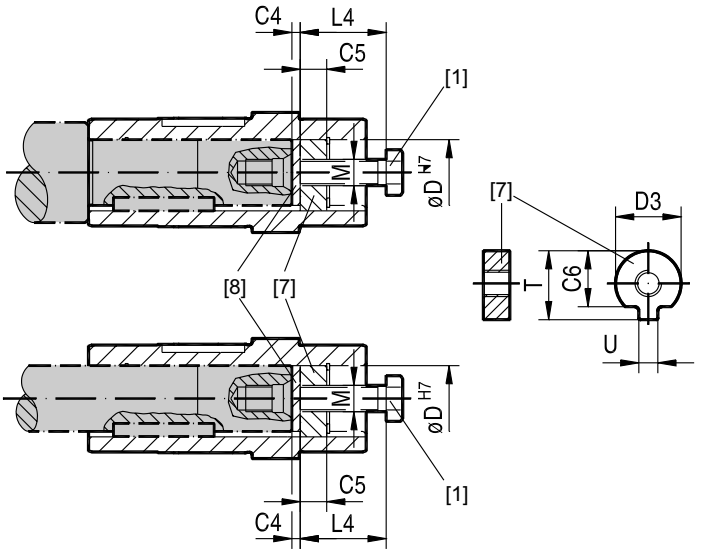


211529227

[1] Retaining screw
[4] Circlip
[6] Customer shaft
[7] Fixed nut
[8] Forcing disk

5.7.3 SEW installation and removal kit

The SEW-EURODRIVE assembly/disassembly kit can be ordered by quoting the specified part number.



211531403

[1] Retaining screw
[7] Fixed nut for disassembly
[8] Forcing disk

Type	D^{H7} [mm]	M[1)]	C4 [mm]	C5 [mm]	C6 [mm]	$U^{-0.5}$ [mm]	$T^{-0.5}$ [mm]	$D3^{-0.5}$ [mm]	L4 [mm]	Part number of the installation/ removal kit
WA..10	16	M5	5	5	12	4.5	18	15.7	50	643 712 5
WA..20	18	M6	5	6	13.5	5.5	20.5	17.7	25	643,682 X
WA..20, WA..30, SA..37, WA..37	20	M6	5	6	15.5	5.5	22.5	19.7	25	643 683 8
FA..27, SA..47	25	M10	5	10	20	7.5	28	24.7	35	643 684 6
FA..37, KA..37, SA..47, SA..57	30	M10	5	10	25	7.5	33	29.7	35	643 685 4
FA..47, KA..47, SA..57	35	M12	5	12	29	9.5	38	34.7	45	643 686 2
FA..57, KA..57, FA..67, KA..67, SA..67	40	M16	5	12	34	11.5	41.9	39.7	50	643 687 0
SA..67	45	M16	5	12	38.5	13.5	48.5	44.7	50	643 688 9
FA..77, KA..77, SA..77	50	M16	5	12	43.5	13.5	53.5	49.7	50	643 689 7
FA..87, KA..87, SA..77, SA..87	60	M20	5	16	56	17.5	64	59.7	60	643 690 0
FA..97, KA..97, SA..87, SA..97	70	M20	5	16	65.5	19.5	74.5	69.7	60	643 691 9
FA..107, KA..107, SA..97	90	M24	5	20	80	24.5	95	89.7	70	643 692 7
FA..127, KA..127	100	M24	5	20	89	27.5	106	99.7	70	643 693 5
FA..157, KA..157	120	M24	5	20	107	31	127	119.7	70	643 694 3

1) Retaining screw

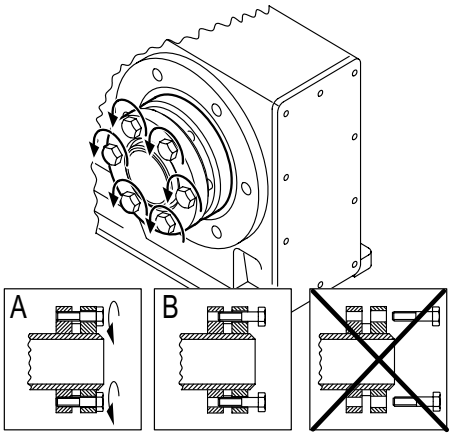
	NOTE
	The SEW installation kit for attaching the customer shaft is a recommendation by SEW-EURODRIVE. You must always check whether this design can compensate the axial loads. In particular applications (e.g. mounting mixer shafts), a different design may have to be used to secure the shaft axially. In these cases, customers can use their own devices. However, you must ensure that these designs do not cause potential sources of combustion according to DIN EN 13463 (for example, impact sparks).

5.8 Shaft-mounted gear units with shrink disk

5.8.1 Installation notes

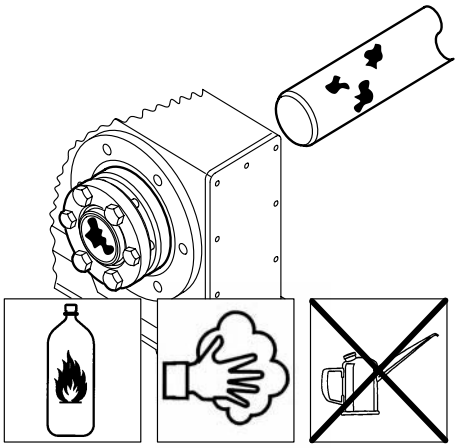
	CAUTION!
	Tightening the screws without installed shaft may result in the hollow shaft being deformed. Potential damage to property! • Only tighten the locking screws with the shaft installed.

1. Loosen the locking screws by a few turns (do not unscrew them completely!).



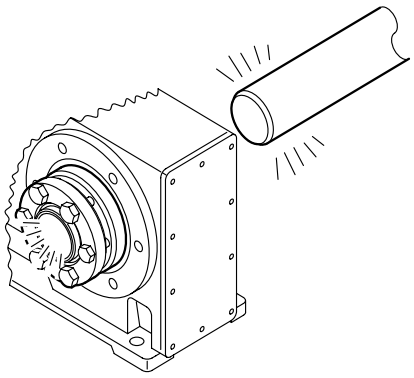
211533579

2. Carefully degrease the hollow shaft hole and the input shaft.



211535755

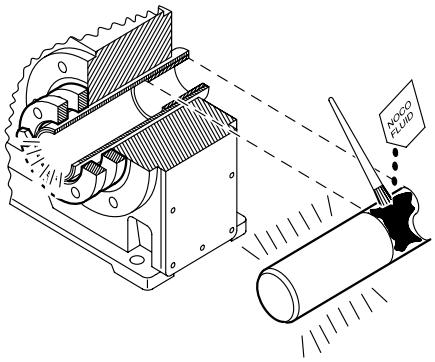
3. Hollow shaft/input shaft after degreasing.



211537931

4. Apply NOCO® Fluid to the input shaft in the area of the bushing.

   It is essential to make sure that the clamping area of the shrink disk is free from grease! Never apply NOCO® Fluid directly to the socket [11], since the paste may get into the clamping area of the shrink disk when the input shaft is put on.

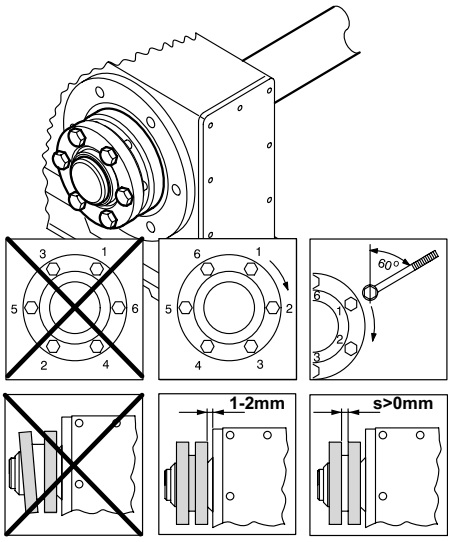


211540107

5. Install the input shaft.
   - Make sure that the locking collars of the shrink disk are installed in parallel to each other.
   - For gear unit housings with shaft shoulder:

     Mount the shrink disk onto the stop on the shaft shoulder.
   - For gear unit housings without shaft shoulder:

     Install the shrink disk with a 1 to 2 mm distance from the gear unit housing.
   - Tighten the locking screws by working round with the torque wrench several times from one screw to the next (not in diametrically opposite sequence). For tightening torques, refer to the following table.



211542283

6. After the installation, make sure the remaining gap between the outer rings is > 0 mm.
7. Grease the the area around the shrink disk outside of the hollow shaft to prevent corrosion.

Gear unit type				Screw	Nm	max.[1]
		SH37	WH37	M5	5	60°
KH37...77	FH37...77	SH47...77		M6	12	
KH87/97	FH87/97	SH87/97		M8	30	
KH107	FH107			M10	59	
KH127/157	FH127/157			M12	100	
KH167				M16	250	
KH187				M20	470	

1) Maximum tightening angle per rotation

5.8.2 Removal notes

⚠ CAUTION!

Risk of jamming and crushing due to improper removal of heavy components.

Risk of injury.

- Observe the following removal notes.
- Removing the shrink disk properly.

1. Loosen the locking screws one after the other by a quarter rotation to avoid tilting the outer rings.
2. Unscrew the locking bolts evenly one after the other. Do not remove the locking screws completely.
3. Remove the shaft or pull the hub off the shaft. (remove any rust that may have formed between the hub and the end of the shaft beforehand).
4. Remove the shrink disk from the hub.

5.8.3 Cleaning and lubrication

There is no need to dismantle removed shrink disks before they are reinstalled.

Clean and lubricate the shrink disk if it is dirty.

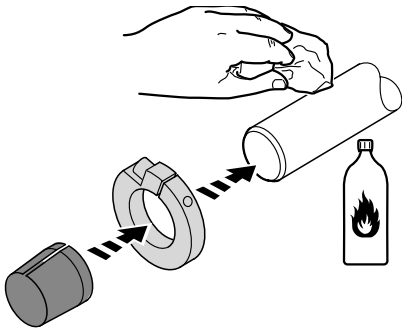
Lubricate the tapered surfaces with one of the following solid lubricants:

Lubricant (Mo S2)	Sold as
Molykote 321 (lube coat)	Spray
Molykote spray (powder spray)	Spray
Molykote G Rapid	Spray or paste
Aemasol MO 19P	Spray or paste
Aemasol DIO-sétral 57 N (lube coat)	Spray

Grease the locking screws with a multipurpose grease such as Molykote BR 2 or similar.

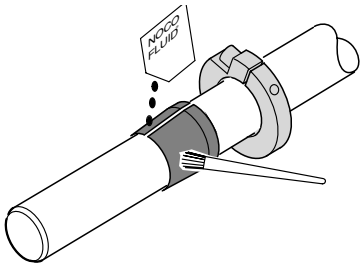
5.9 Shaft-mounted gear unit with TorqLOC®

1. Clean the customer shaft and the inside of the hollow shaft. Ensure that all traces of grease or oil are removed.
2. Install the stop ring and the bushing on the customer shaft.



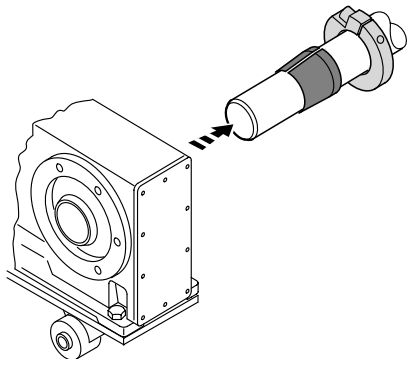
211941003

3. Apply and thoroughly spread NOCO® Fluid on the bushing.



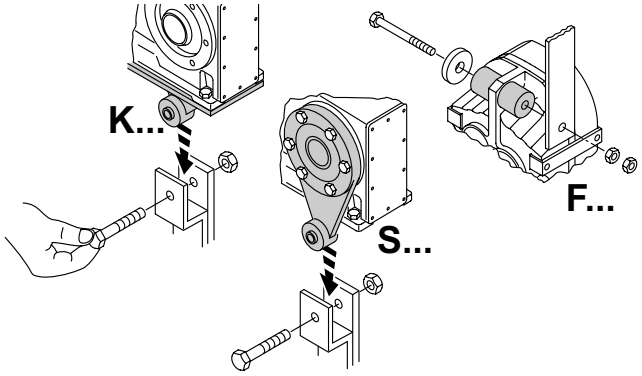
211938827

4. Push the gear unit onto the customer shaft.



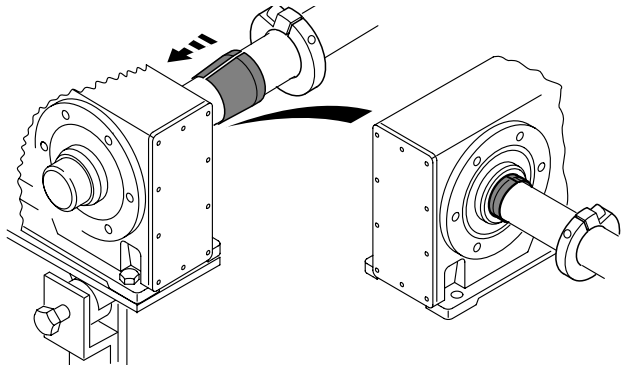
211936651

5. Preassemble the torque arm (do not tighten the screws).



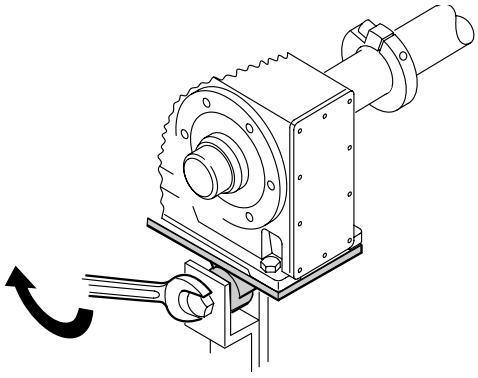
211943179

6. Push the busing onto the gear unit up to the stop.



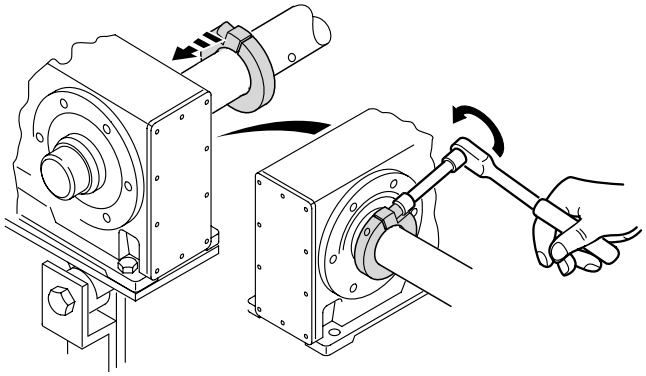
211945355

7. Tighten all the retaining screws of the torque arm.



211947531

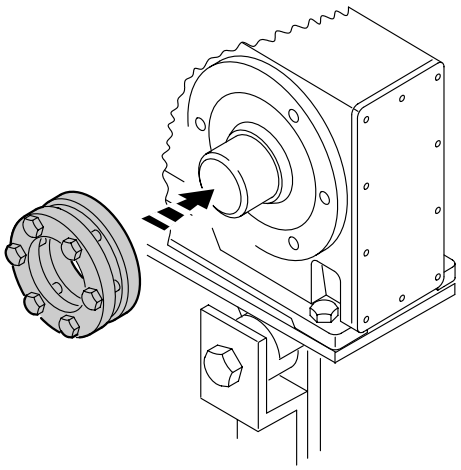
8. Secure the bushing with the split ring. Tighten the split ring on the bushing using the appropriate torque as specified in the following table:



212000907

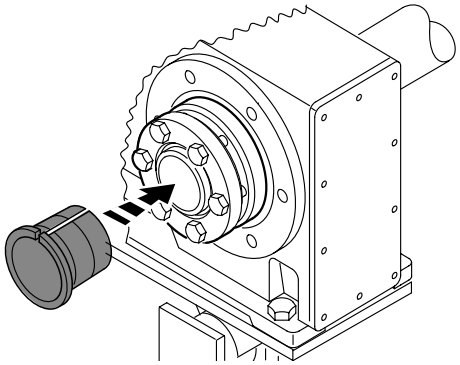
Type		nickel-plated [Standard]	Stainless steel
KT/FT	ST	Torque [Nm]	
-	37	18	7.5
37	47	18	7.5
47	57	18	7.5
57, 67	67	35	18
77	77	35	18
87	87	35	18
97	97	35	18
107	–	38	38
127	–	65	65
157	–	150	150

9. Make sure that all screws are loosened and slide the shrink disk onto the hollow shaft.



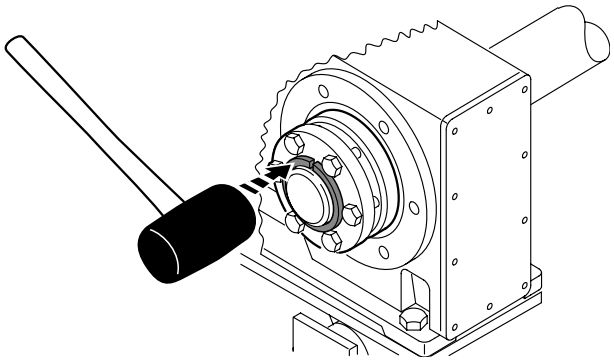
212003083

10. Slide the counter bushing onto the customer shaft and into the hollow shaft



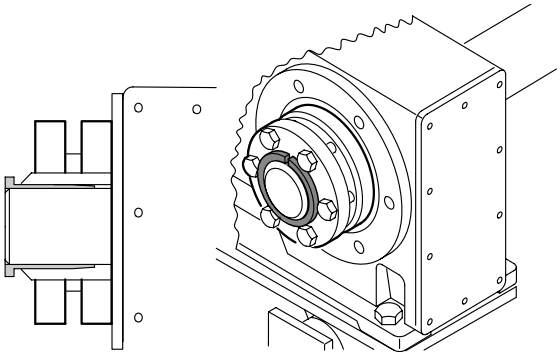
212005259

11. until the shrink disk is properly seated.
12. Tap lightly on the flange of the counter bushing to ensure that the socket is fitted securely in the hollow shaft.



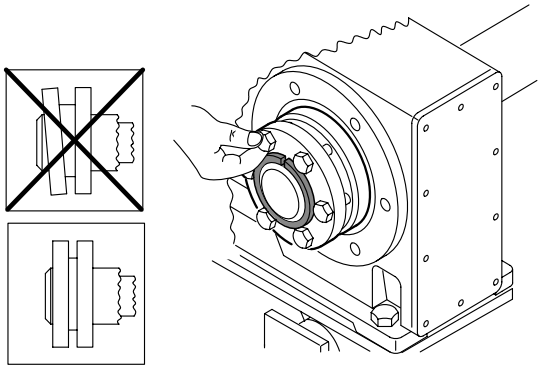
212007435

13. Make sure that the customer shaft is seated in the counter bushing.



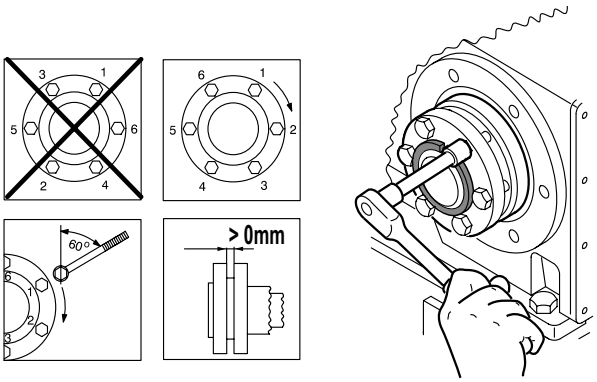
212009611

14. Manually tighten the bolts of the shrink disk and ensure that the end rings of the shrink disk are parallel.



212011787

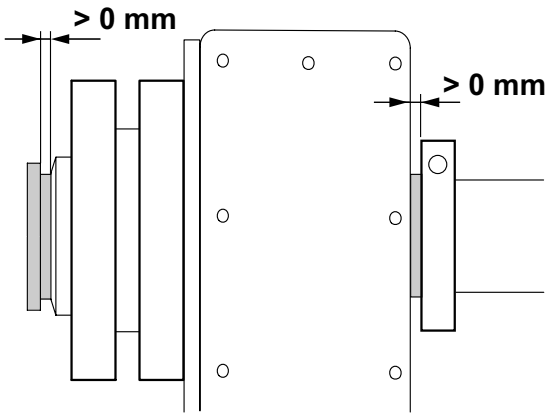
15. Tighten the locking screws with a torque wrench by working round several times from one bolt to the next (not in diametrically opposite sequence) according to the following table:



212013963

Type		nickel-plated [Standard]	Stainless steel
KT/FT	ST	Torque [Nm]	
-	37	4.1	6.8
37	47	10	6.8
47	57	12	6.8
57, 67	67	12	15
77	77	30	30
87	87	30	50
97	97	30	50
107	–	59	50
127	–	100	120
157	–	100	120

16. After the installation, make sure the remaining gap between the outer rings is > 0 mm.
17. The remaining gap between counter bushing and hollow shaft end as well as stop ring bushing and split ring must be > 0 mm.



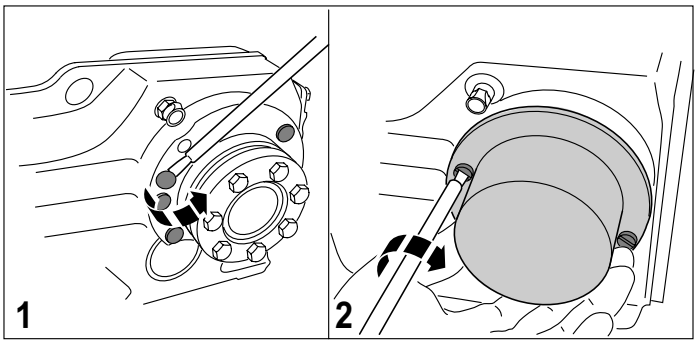
212016139

5.10 Installing the protective cover

	NOTE ON EXPLOSION PROTECTION
	Prior to installation, make sure that • there is a flawless glued connection between sealing and cover • the bores of the seal and the cover correspond

	⚠ CAUTION!
	During operation, output components are in fast motion. Risk of jamming and crushing. • Disconnect the motor from the power supply before starting work and safeguard against accidental startup. • Cover input and output elements with a touch guard.

5.10.1 Installing the fixed cover



1. To fasten the cover, remove the plastic plug on the gear unit housing (see figure 1)
2. Use the delivered screws to mount the cover to the gear unit housing (see figure 2).

5.10.2 Installation without cover

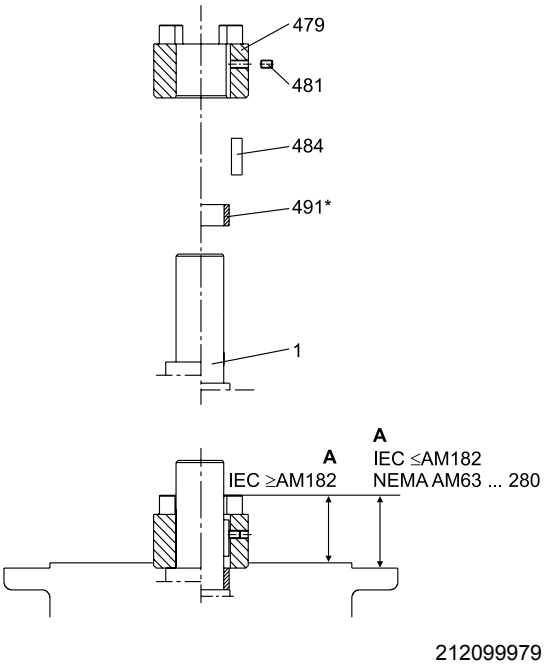
In certain individual cases (e.g. through-shaft), you cannot install the cover. In such cases, the cover is not necessary if the system or unit manufacturer provides corresponding components to guarantee for the compliance with the required degree of protection to EN DIN 13463-1.

If this results in additional maintenance, you have to describe this in the operating instructions for the system/component.

5.11 Coupling of AM adapter

	NOTE ON EXPLOSION PROTECTION
	You must not use distance bushings as an assembly tool!

5.11.1 IEC adapter AM63 - 280 / NEMA adapter AM56 - 365



[1] Motor shaft
[479] Coupling half
[481] Setscrew
[484] Key
[491] Spacer tube

1. Clean the motor shaft and the flange surfaces of the motor and the adapter.
2. Remove the key from the motor shaft and replace it with the supplied key [484] (not AM63 and AM250).
3. Heat the coupling half [479] to approx. 80 - 100 °C and push the coupling half onto the motor shaft. Position as follows:
   - IEC adapter AM63 - 225 Until stop at motor shaft shoulder.
   - IEC adapter AM250 - 280 to dimension **A**.
   - NEMA adapter with spacer tube [491] to dimension **A**.
4. Secure the key and coupling half using the setscrew [481] and tightening torque T_A according to the table on the motor shaft.

5. Check the dimension **A**.
6. Seal the contact surfaces between the adapter and motor using a suitable sealing compound.
7. Mount the motor on the adapter. Ensure that the coupling claw of the adapter shaft is engaged in the plastic cam ring.

IEC AM	63 / 71	80 / 90	100 / 112	132	160 / 180	200	225	250 / 280
A	24.5	31.5	41.5	54	76	78.5	93.5	139
T_A	1.5	1.5	4.8	4.8	10	17	17	17
Thread	M4	M4	M6	M6	M8	M10	M10	M10
NEMA AM	56	143 / 145	182 / 184	213 / 215	254 / 256	284 / 286	324 / 326	364 / 365
A	46	43	55	63.5	78.5	85.5	107	107
T_A	1.5	1.5	4.8	4.8	10	17	17	17
Thread	M4	M4	M6	M6	M8	M10	M10	M10

NOTE

To avoid contact corrosion, we recommend applying NOCO® Fluid to the motor shaft before mounting the coupling half.

CAUTION!

Dampness might enter the adapter when mounting a motor to the adapter.

Potential damage to property!

- Seal adapter with anaerobic fluid seal

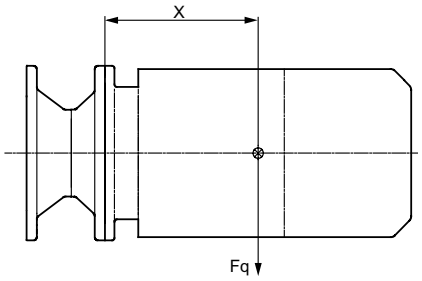
Permitted loads

CAUTION!

Impermissibly high loads may occur when mounting a motor.

Potential damage to property!

- The load data specified in the following table are not to be exceeded.



18513419

Adapter type			F_q [1] [N]	
IEC	NEMA	x [1] [mm]	IEC adapter	NEMA adapter
AM63/71	**AM56**	77	530	410
AM80/90	**AM143/145**	113	420	380
AM100/112	**AM182/184**	144	2000	1760
AM132 [2]	**AM213/2152** [2]	186	1600	1250
AM132..	**AM213/215**		4700	3690
AM160/180	**AM254/286**	251	4600	4340
AM200/225	**AM324-AM365**	297	5600	5250
AM250/280	**-**	390	11200	-

1) **The maximum permitted weight of the attached motor F_{qmax} must be reduced linearly as the center of gravity distance x increases. If this distance is reduced, the maximum permitted weight F_{qmax} cannot be increased.**
2) Diameter of the adapter output flange: 160 mm

AM adapter with AM../RS backstop

Check the direction of rotation of the drive prior to assembly or startup. Please inform the SEW-EURODRIVE service in the case of incorrect direction of rotation.

The backstop is maintenance-free in operation, and does not require any further maintenance work. Backstops have a minimum lift-off speed depending on the size (see following table).

.

CAUTION!

If the actual speed level is below the minimum lift-off speed level, the backstops are subject to wear, and the resulting friction causes the temperature to increase.

Potential damage to property!

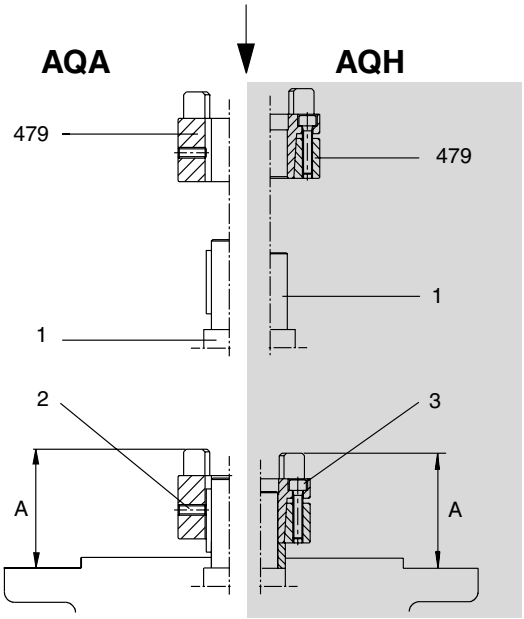
- In rated operation, the lift-off speeds must not drop below the minimum values.
- During startup or braking, the lift-off speeds may drop below the minimum levels.

Type	Maximum locking torque of backstop [Nm]	Minimum lift-off speed [rpm]
AM80/90/RS, AM143/145/RS	65	820
AM100/112/RS, AM182/184/RS	425	620
AM132/RS, AM213/215/RS	850	530
AM160/180/RS, AM254/286/RS	1450	480
AM200/225/RS, AM324-365/RS	1950	450
AM250/280/RS,	1950	450

5.12 Coupling of AQ adapter

	NOTE ON EXPLOSION PROTECTION
	You must not use distance bushings as an assembly tool!

5.12.1 AQA80 - 190 adapter / AQH80 - 190 adapter



212114955

1 Motor shaft
2 Grub screw
3 screws

AQA = With keyway
AQH = Without keyway

1. Clean the motor shaft and the flange surfaces of the motor and the adapter.
2. **Type AQH:** Loosen the screws of the coupling half (479) and loosen the conical connection.
3. Heat up the coupling half (80 °C - 100 °C) and slide it onto the motor shaft.

   AQA / AQH design: up to clearance "A" (see table)

4. **Type AQH:** Tighten the screws evenly in diametrically opposite sequence, working round several times. Make sure that all the screws are tightened with the tightening torque T_A according to the following table.

   Type AQA: Secure the coupling halves using the setscrew (see table).

5. Check the position of the coupling half (clearance "A", see table).

   Install motor onto the adapter making sure that the dogs of the two coupling halves engage in each other. The force that must be applied when joining the two coupling halves is dissipated after final assembly, so there is no risk of any axial load being applied to adjacent bearings.

NOTE

Only for AQA, not permitted for AQH: To avoid contact corrosion, we recommend applying NOCO® Fluid to the motor shaft before mounting the coupling half.

CAUTION!

Dampness might enter the adapter when mounting a motor to the adapter.

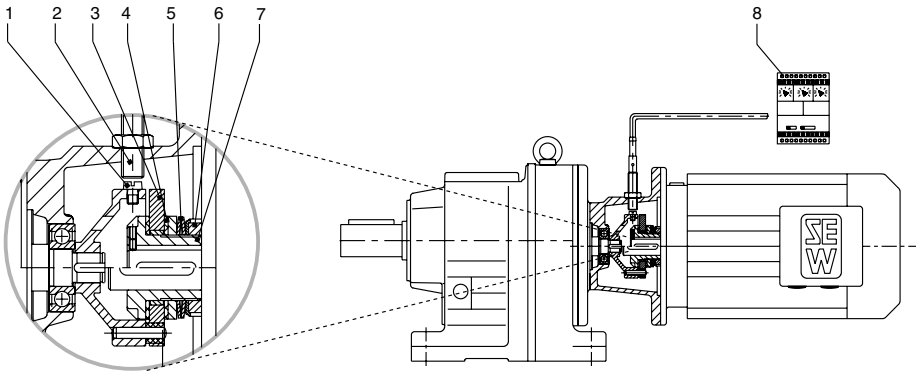
Potential damage to property!

- Seal adapter with anaerobic fluid seal

5.12.2 Setting dimensions/tightening torques

Type	Coupling size	Clearance "A" [mm]	Bolts DIN 912		Tightening torque T_A [Nm]	
			AQA	AQH	AQA	AQH
AQA /AQH 80 /1/2/3	19/24	44,5	M5	M4	2	3
AQA /AQH 100 /1/2		39				
AQA /AQH 100 /3/4		53				
AQA /AQH 115 /1/2		62				
AQA /AQH 115 /3	24/28	62	M5	M5	2	6
AQA /AQH 140 /1/2		62				
AQA /AQH 140 /3	28/38	74,5	M8	M5	10	6
AQA /AQH 190 /1/2		76,5				
AQA /AQH 190 /3	38/45	100	M8	M6	10	10

5.13 Adapter with a torque limiting coupling AR



[1] Trigger cams
[2] Encoder
[3] Driving disk
[4] Friction lining
[5] Cup spring
[6] Slotted nut
[7] Friction hub
[8] Speed monitor

Drives with a torque limiting coupling consist of a standard gear unit and motor/variable speed geared motor with an adapter installed between them. The torque limiting coupling is installed in this adapter. In gearmotors with a multi-stage gear unit, the torque limiting coupling may be located between the first and second gear units.

Via the friction lining [4] of the driving disk [3], the input friction hub [7] with cup springs [5] and slotted nut [6] drives the output coupling plate with connecting pin. The slip torque is individually set in the factory according to the specific drive selection.

The speed of the coupling plate at the output end is picked up by an encoder [2] and passed on to a monitoring unit [8]. Speed monitors and slip monitors are used as monitoring units. These can be mounted in conjunction with contactors, fuse units, etc. on a standard 35 mm rail (to DIN EN 50022) in the switch cabinet or they can be attached using two holes.

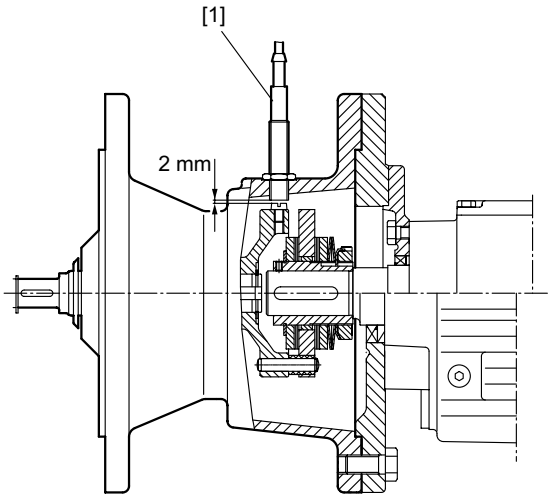
5.13.1 WEX speed monitor

The speed monitor [8] is used with constant-speed gearmotors and is connected to the encoder [2] in the adapter.

5.13.2 Assembly

Mounting the encoder

1. Remove the fan guard from the driving motor
2. Slowly turn the motor or adapter shaft extension until a trip cam (= head of the cheese head screw) becomes visible in the threaded hole
3. Screw in the encoder until contact is made with the trip cam
4. Turn the encoder [1] back by two turns (corresponds to a clearance of 2 mm)



5. Use a lock nut to secure the encoder on the outside of the adapter
6. Check: Slowly turn the motor or adapter shaft extension

   Correct mounting: trip cams do not touch the encoder
7. Install the fan guard

	NOTE ON EXPLOSION PROTECTION
	The speed monitor must be located outside the potentially explosive atmosphere.

Connecting monitoring devices

	NOTE ON EXPLOSION PROTECTION
	Do not route the supply cables in multicore cables to avoid interference from parasitic voltages. Maximum line lengths 500 m with core cross section 1.5 mm^2. Use shielded cables if there is a risk of interference from power current or control cables and if the lines are longer than 10 m. **You must observe the respectively applicable standards. Especially in potentially explosive atmospheres!**

1. **For design with WEX speed monitor**

   Connect the incremental encoder of the adapter to the speed monitor

   - using a 2-core cable
   - Incremental encoder generates one pulse per revolution

2. Connect the speed monitor according to the wiring diagram supplied with the brake.

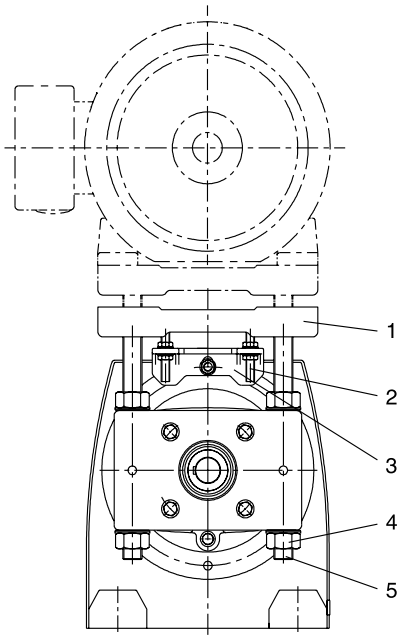
5.14 AD input shaft assembly

Observe section "Assembling the input and output components" (see page 30) when installing input components.

	NOTE ON EXPLOSION PROTECTION
	Use belts with sufficient electrical bleeder resistor (< 10^9 Ω). • Before a protection cover can be installed, a risk analysis must demonstrate that no sources of ignition (e.g. impact sparks from grinding) can occur. The manufacturer of the protection cover must perform the risk analysis.

5.14.1 AD../P – cover with motor mounting platform

Mounting the motor and adjusting the motor mounting platform.



[1] Motor mounting platform
[2] Stud bolt (only AD6/P / AD7/P)
[3] Support (only AD6/P / AD7/P)
[4] Nut
[5] Threaded column

1. Set the motor mounting platform to the required mounting position by evenly tightening the adjusting nuts. Remove the lifting eyebolt from helical gear units in order to achieve the lowest adjustment position. Touch up any damage to the paint work.
2. Align the motor on the motor mounting platform (shaft ends must be in alignment) and secure it.
3. Mount the input elements on the input shaft end and the motor shaft, line them up with one another and correct the motor position again, if necessary.
4. Put on the traction elements (V-belt, chain, etc.) and apply a preload by evenly adjusting the motor mounting platform. Do not stress the motor mounting platform and the columns against each other when doing this.
5. Tighten all the nuts not used for adjustment in order to fix the threaded columns.

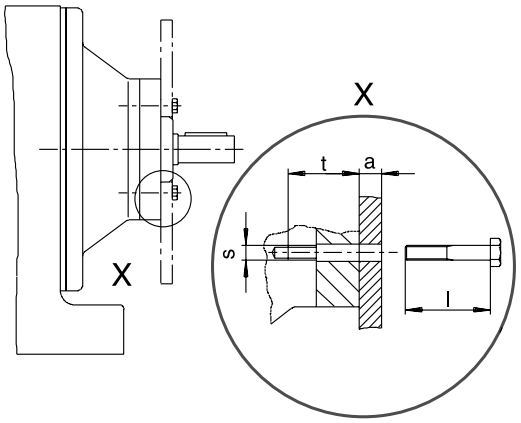
5.14.2 Only AD6/P and AD7/P

Unscrew the nuts on the stud bolts before adjustment to allow the stud bolts to move axially in the support without restriction. Do not tighten the nuts until the final adjustment position has been reached. Do not adjust the motor mounting platform using the support.

5.14.3 AD../ZR – input cover with centering shoulder

Mounting applications on the input shaft assembly with centering shoulder.

1. Retaining bolts of a suitable length must be used to secure the application. The length l of the new bolts is calculated as follows:



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[l] t+a
[t] Screw-in depth (see table)
[a] Thickness of the application
[s] Retaining thread (see table)

Round down the calculated screw length to the next smaller standard length.

2. Remove the retaining screws from the centering shoulder.
3. Clean the contact surface and the centering shoulder.

4. Clean the threads of the new bolts and apply a bolt locking compound (e.g. Loctite® 243) to the first few threads.
5. Attach the application to the centering shoulder and tighten the retaining screws with the specified tightening torque T_A (see table).

Type	Screw-in depth t [mm]	Retaining thread s	Tightening torque T_A for connection screws of strength class 8.8 [Nm]
AD2/ZR	25,5	M8	25
AD3/ZR	31,5	M10	48
AD4/ZR	36	M12	86
AD5/ZR	44	M12	86
AD6/ZR	48,5	M16	210
AD7/ZR	49	M20	410
AD8/ZR	42	M12	86

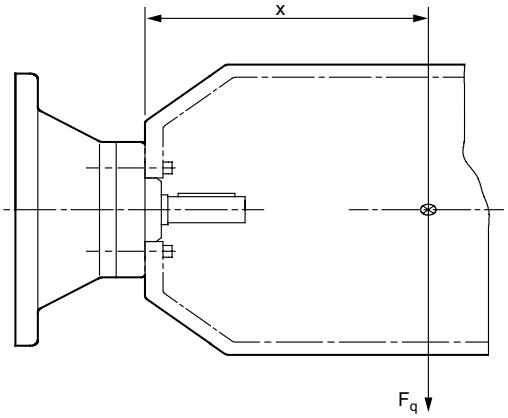
Permitted loads

CAUTION!

Impermissibly high loads may occur when mounting a motor.

Potential damage to property!

- The load data specified in the following table are not to be exceeded.



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Type	x[1)] [mm]	F_q[1)] [N]
AD2/ZR	193	330
AD3/ZR	274	1400
AD4/ZR[2)]	361	1120
AD4/ZR		3300
AD5/ZR	487	3200
AD6/ZR	567	3900
AD7/ZR	663	10000
AD8/ZR	516	4300

1) Maximum load values for connection screws of strength class 8.8. The maximum permitted weight of the attached motor F_{qmax} must be reduced linearly as the center of gravity distance x increases. When this distance is reduced, F_{qmax} cannot be increased.

2) Diameter of the adapter output flange: 160 mm

5.14.4 AD../RS – cover with backstop

Check the direction of rotation of the drive prior to assembly or startup. Please inform the SEW-EURODRIVE service in the case of incorrect direction of rotation.

The backstop is maintenance-free in operation, and does not require any further maintenance work. Backstops have a minimum lift-off speed depending on the size (see following table).

CAUTION!

If the actual speed level is below the minimum lift-off speed level, the backstops are subject to wear, and the resulting friction causes the temperature to increase.

Potential damage to property!

- In rated operation, the lift-off speeds must not drop below the minimum values.
- During startup or braking, the lift-off speeds may drop below the minimum levels.

Type	Maximum locking torque of backstop [Nm]	Minimum lift-off speed [rpm]
AD2/RS	65	820
AD3/RS	425	620
AD4/RS	850	530
AD5/RS	1450	480
AD6/RS	1950	450
AD7/RS	1950	450
AD8/RS	1950	450

6 Startup

	NOTE ON EXPLOSION PROTECTION
	Prior to startup check that the oil level is as specified for the mounting position. The oil checking and drain screws and the breather valves must be freely accessible.

6.1 Checking the oil level

Before startup, make sure that the oil level corresponds to the mounting position. Observe section "Checking the oil level and changing the oil".

6.2 Measuring surface and oil temperature

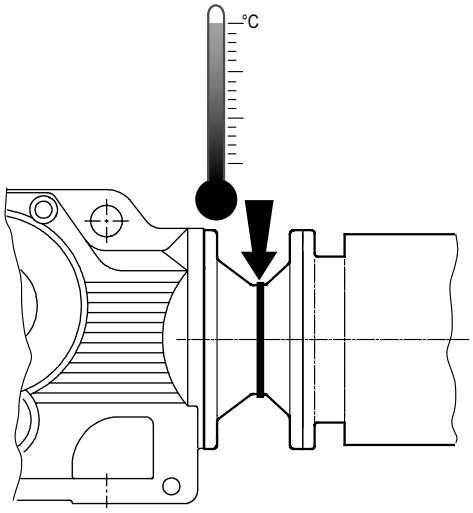
	NOTE
	The nameplate data on maximum surface temperature is based on measurements at standard ambient conditions and installation altitudes. Even slight changes of these conditions (such as limited installation space) can have a tremendous impact on the temperature.

6.2.1 Measuring the surface temperature

It is absolutely necessary to measure the surface temperature at maximum load during startup of the gear unit. A commercially available thermometer is sufficient for this measurement. Measure the surface temperature at the transition space between gear unit and motor where the position of the terminal box prevents venting by the motor fan. The maximum surface temperature will be reached after approximately three hours and **must not exceed a difference value of 70 K** when compared with the ambient temperature.

	NOTE ON EXPLOSION PROTECTION
	Stop the drive immediately if the difference exceeds the given value. Consult SEW-EURODRIVE!

For gear units with AM, AQ, AR adapter, or AD input shaft assembly, the surface temperature is measured at the joint between input gear unit flange and customer motor flange (see following picture).



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6.2.2 Measuring the oil temperature

It is necessary to measure the oil temperature to determine the lubricant change intervals set forth in the section Inspection and Maintenance. (see page 81) To do so, measure the temperature at the bottom of the gear unit. In gear units with oil drain plug, you will have to measure the temperature at the oil drain plug. Add 10 K to the measured value. Use this temperature value to determine the lubricant change interval.

6.3 Helical-worm and SPIROPLAN® W gear units

	NOTES
	Note: The direction of rotation of the output shaft in series S..7 helical-worm gear units has been changed from CW to CCW; this is different from the S..2 series. Change in direction of rotation: Swap two motor feeder cables.

6.3.1 Run-in period

SPIROPLAN® and helical-worm gear units require a running-in period of at least 48 h before reaching their maximum efficiency. A separate run-in period applies for each direction of rotation if the gear unit is operated in both directions of rotation. The table shows the average power reduction during the run-in period.

Helical-worm gear unit

	Worm	
	i range	η reduction
1 start	approx. 50 ... 280	approx. 12 %
2 start	approx. 20 ... 75	approx. 6 %
3 start	approx. 20 ... 90	approx. 3 %
4 start	-	-
5 start	approx. 6 ... 25	approx. 3 %
6 start	approx. 7 ... 25	approx. 2 %

Spiroplan® gear units

W10 / W20 / W30		**W37**	
i range	η reduction	**i range**	η reduction
approx. 35 ... 75	approx. 15 %		
approx. 20 ... 35	approx. 10 %		
approx. 10 ... 20	approx. 8 %	approx. 30...70	approx. 8 %
approx. 8	approx. 5 %	approx. 10 ... 30	approx. 5%
approx. 6	approx. 3 %	approx. 3...10	approx. 3%

6.4 Helical/parallel shaft helical/helical-bevel gear units

6.4.1 Stand-alone gear units

For gear units with an adapter, or input shaft assembly, you must ensure that the data specified on the nameplate are not exceeded. It is essential that the gear unit is not overloaded.

6.4.2 Mains operated motors

Check that the data specified on the nameplate of the gear unit and the motor corresponds to the ambient conditions at the location where the drive is to be installed.

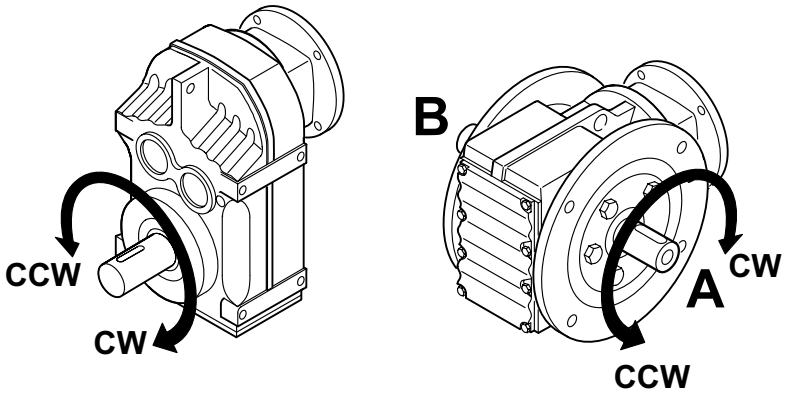
6.4.3 Inverter-operated gearmotors

- Check that the gearmotor is also approved for operation with an inverter (nameplate).
- The parameter settings made for the inverter must prevent the gear unit from being overloaded. Refer to the nameplate for performance data permitted for the respective gear unit.

6.5 Gear units with backstop

The purpose of a backstop is to prevent undesirable reverse rotation. During operation, the backstop permits rotation in only one specified direction of rotation.

	CAUTION!
	Operating the motor in the direction that is blocked could destroy the backstop. Potential damage to property! • Do not start up the motor in the blocking direction. In order to achieve the desired direction of rotation, observe the correct power supply for the motor. • The backstop can be operated in blocking direction with half the output torque once for control purposes.



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The direction of rotation is determined with a view to the output shaft (LSS).

- Clockwise (CW)
- Counterclockwise (CCW)

The permitted direction of rotation is indicated on the housing.

6.6 Speed monitoring

6.6.1 WEX option standard design

The standard version of the explosion-proof AR adapter features an M12x1 thread for mounting a voltage encoder in the motor flange of the adapter. Speed monitor and voltage encoder are included in the scope of delivery.

6.6.2 Manufacturer's data

Speed monitor in WEX design:

Manufacturer:	Pepperl + Fuchs, Mannheim
Type:	KFU8-UFC-Ex1.D
Auxiliary power:	DC 20 - 90 V / AC 48 - 253 V
ATEX certification number	TÜV 99 ATEX 1471

Voltage encoder in WEXA/WEX/IGEX design:

Manufacturer:	Pepperl + Fuchs, Mannheim
Type:	NCB12-12GM35-N0 in accordance with DIN 19234 (NAMUR)
Housing:	M12x1
ATEX certification number	TÜV 99 ATEX 1471

6.7 Installation and adjustment of the WEX speed monitor

1. Read the operating instructions of the speed monitor manufacturer before you begin with the installation!
2. Perform the basic adjustment of the speed monitor in accordance with the operating instructions of the speed monitor manufacturer.

The setting must cause the drive to be switched off when the actual speed falls below 95% of the rated speed of the motor used. Refer to the nameplate of the drive motor for the rated speed.

The sensor integrated in the adapter generates 1 pulse per revolution of the adapter shaft. If the switching speed of the adapter is too low, i.e. the coupling slips, the motor must be disconnected from the supply voltage immediately.

The cause of the problem must be eliminated and the operation of the adapter must be stopped for at least 15 minutes before re-startup. If incorrect operation by the operating personnel cannot be ruled out, this interval should be triggered by an automatic restart lockout.

All installation and setting notes given below refer to the speed monitor or voltage encoder in WEX version.

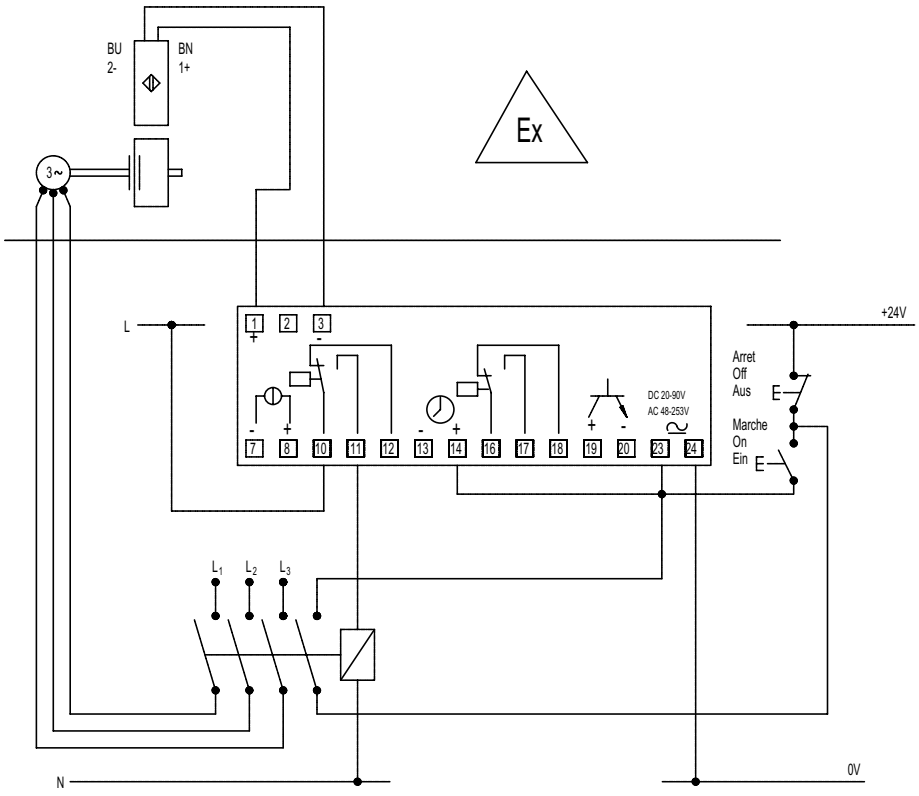
If other speed monitors are used, they must be installed and started up according to the manufacturer's documentation.

The speed monitor must be located outside the potentially explosive atmosphere.

6.7.1 Installation and adjustment of the WEXA/WEX speed monitor

Relay 2 can be used for creating a warning signal or for machine control (terminal assignment 16-18).

The wiring diagram below shows possible wiring of the speed monitor.



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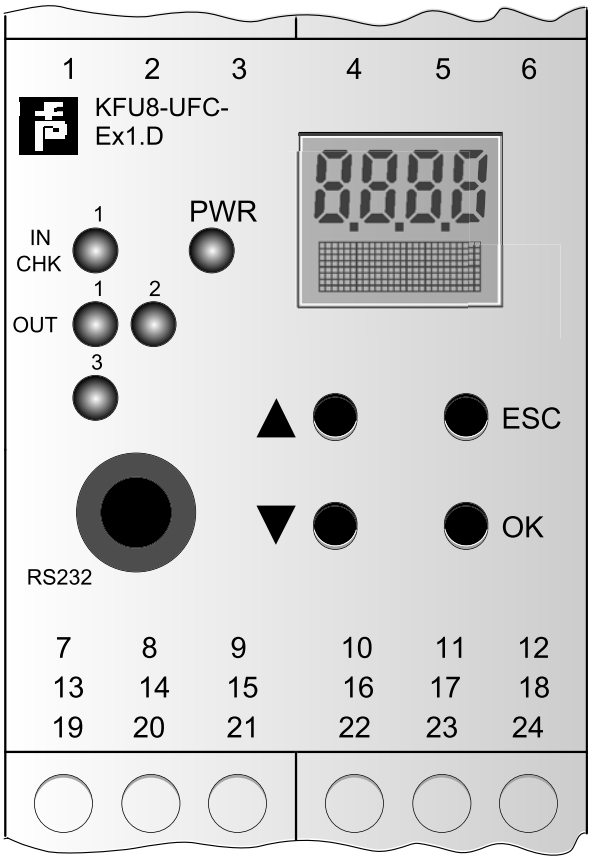
[1] Sensor +
[3] Sensor -
[10] Relay 1 (common wiring)
[11] Relay 1 (normally open contact)
[12] Relay 1 (normally closed contact)
[14] Startup bypass
[23] DC 24 V voltage supply, +
[24] DC 24 V voltage supply, -
[19] Auxiliary output for customer application, +
[20] Auxiliary output for customer application, -



Front side of the speed monitor:

LED in CHK 1 (yellow/red)	For indicating input pulses (flashes yellow), input interference (blinks red), and unit malfunction (continuously red)
LED PWR (green)	for indicating the supply voltage
LED OUT 1 (yellow)	For indicating that relay 1 is active
LED OUT 2 (yellow)	For indicating that relay 2 is active
LED OUT 3 (yellow)	For indicating that the transistor is active
RS 232	The RS 232 interface for connecting a PC for setting parameters and diagnosing the UFC with PACTware.
Display	for indicating measured values and faults in parameter assignment mode

	NOTE ON EXPLOSION PROTECTION
	The start bypass time may not exceed 3 seconds. This setting must be carefully performed and verified by a final measuring step.

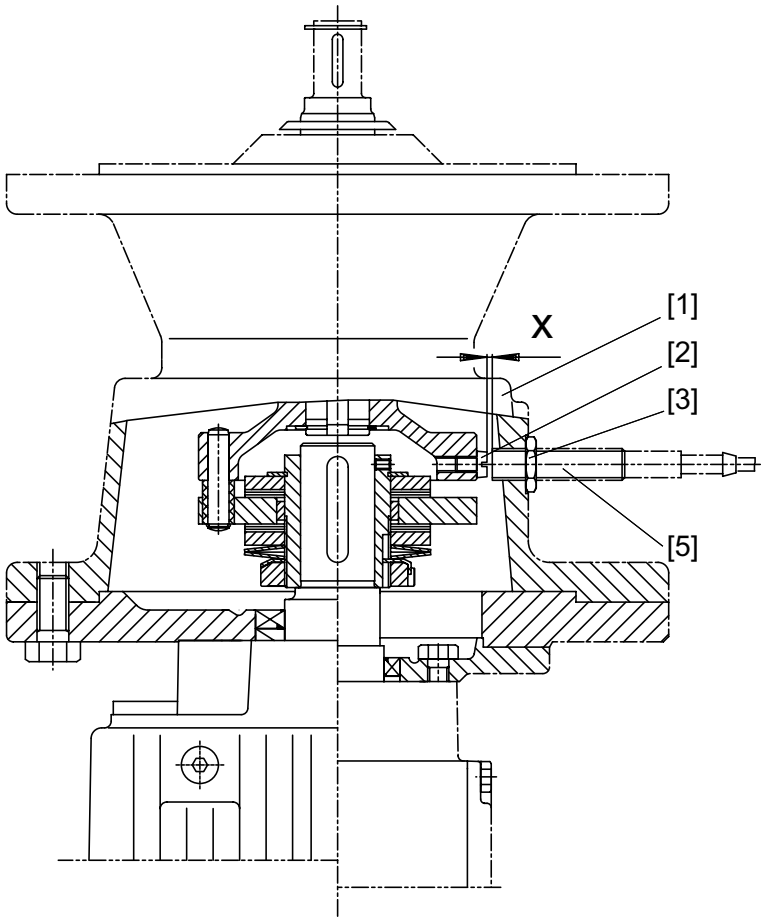
6.7.2 Installation and adjustment of other speed monitors

If other speed monitors are used, they must feature an intrinsically safe sensor input (identification color: blue) for evaluation of sensors according to DIN 19234 (NAMUR) and be approved for use of this sensor in potentially explosive atmospheres.

	NOTE
	The voltage encoder (sensor) generally features a blue connection lead and must conform to DIN 19234 (NAMUR). The corresponding inspection number may be attached to the voltage encoder or the connection lead.

6.8 Installation of the voltage encoder

The following figure illustrates the installation of the voltage encoder and the setting of the switching interval x.



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[1] Adapter flange bearing cover
[2] Screw head
[3] Lock nut
[5] Voltage encoder

1. Rotate the output shaft of the adapter until the slotted screw head can be seen through the tapped hole in the bearing cover.
2. Voltage encoder:
   - carefully screw it into the thread in the adapter flange [1] of the variable speed gear unit until the voltage encoder [5] rests on the screw head [2].
   - Turn the encoder back by 2 turns and secure with the lock nut [3].

The switching interval is now set to 2 mm. During operation, the voltage encoder supplies 1 pulse per revolution at this switching interval.

6.8.1 Changing switching interval x

If no circuit state change occurs at the voltage encoder (LED display) with rotating shaft of the adapter shaft operating with switching interval x = 1 mm, the switching interval can be changed as follows:

1. With **constantly lit LED** [4] of the voltage encoder, turn the voltage encoder a half turn **counterclockwise** at a time and check its function.
2. It the **LED is not lit** [4], turn the voltage encoder **clockwise** by 90 degrees but no more than one time.

CAUTION!

A collision with the slotted screw heads may destroy the voltage encoder.

Potential damage to property!

- Do not turn in the voltage encoder by more than half a turn

3. If a circuit change still does not occur, check the voltage supply of the voltage encoder using the evaluation electronics (with WEXA/WEX design).

7 Inspection/Maintenance

The following gear units are lubricated for life and are thus maintenance-free:

- Helical gear units R07, R17, R27
- F27 Parallel Shaft Helical Gear Units
- SPIROPLAN® gear units

Depending on external factors, the surface/corrosion protection might have to be repaired or renewed.

The following inspection and maintenance intervals apply for all the other gear units.

7.1 Preliminary work regarding gear unit inspection/maintenance

Observe the following notes before you start with the inspection/maintenance work.

⚠ HAZARD!

Risk of crushing if the drive starts up unintentionally.

Severe or fatal injuries.

- Disconnect the gearmotor from the power supply before starting work and protect it against unintentional re-start.

⚠ WARNING!

Danger of burns due to hot gear unit and hot gear unit oil.

Fatal injuries.

- Let motor cool down before beginning work!
- Only remove the oil level and oil drain plug very carefully.

CAUTION!

Filling in the wrong oil may result in significantly different lubricant characteristics.

Potential damage to property!

- Do not mix different synthetic lubricants and do not mix synthetic with mineral lubricants.
- Mineral oil is used as standard lubricant.

NOTE!

The position of the oil level plug, oil drain plug and the breather valve depends on the mounting position. Refer to the diagrams of the mounting positions. See chapter "Mounting Positions" (see page 106).

7.1.1 Cleaning the gear unit

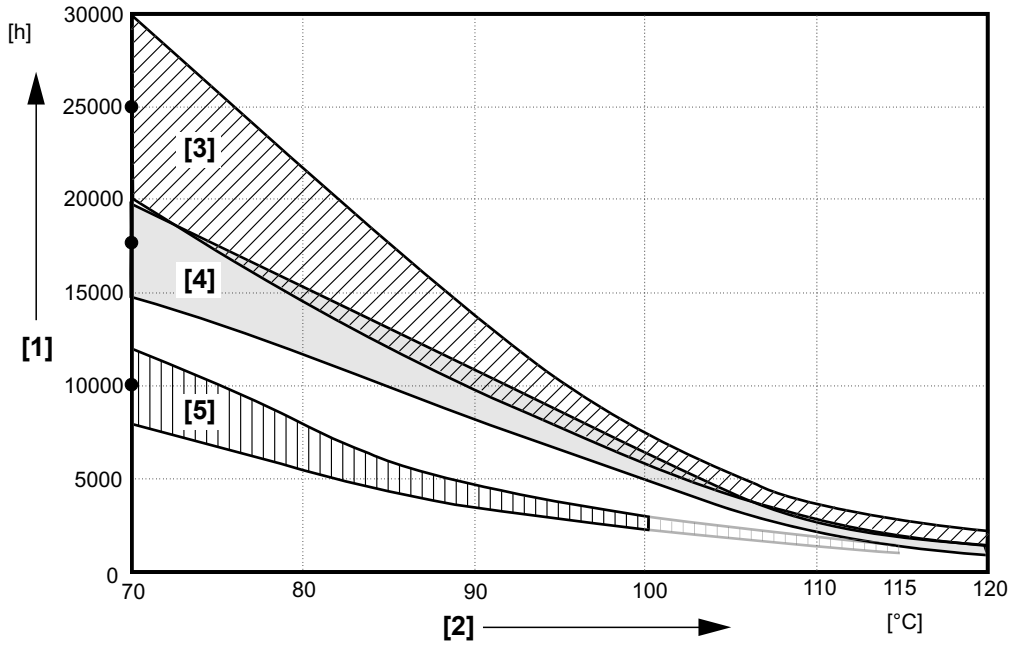
	NOTE ON EXPLOSION PROTECTION
	Do not use materials or procedures (e.g. compressed air) that cause processes causing electrical charge on the coating.

7.2 Inspection/maintenance intervals

Time interval	What do I do?
• Every 3000 operating hours, at least every 6 months	• Check running noise for possible bearing damage • Visually check the seals for leakage. Check oil and oil level in case you suspect any leakages • For gear units with a torque arm: Check the rubber buffer and change it, if necessary
• Every 10,000 hours of operation	• Check oil and oil level
• Depending on the operating and ambient conditions (see illustration below), at least every 3 years	• Replace breather valve
• Depending on the operating and ambient conditions (see illustration below), at least every 5 years • according to oil temperature	• Change synthetic oil • Replace cover plate seal • Replace anti-friction bearing grease (recommendation) • Replace oil seal (do not install it in the same track)
• Varying (depending on external factors)	• Touch up or renew the surfaces/anticorrosion coating

7.3 Lubricant change intervals

The following figure shows the change intervals for standard gear units under normal environmental conditions. Change the oil more frequently when using special versions subject to more severe/aggressive environmental conditions!



[1] Operating hours
[2] Sustained oil bath temperature
- Average value per oil type at 70 °C

[3] CLP PG
[4] CLP HC / HCE
[5] CLP / HLP / E

7.4 Inspection/maintenance for the AL/AM/AQ adapter

Time interval	What do I do?
• Every 3000 operating hours, at least every 6 months	• Check running noise for possible bearing damage • Visually check the adapter for leakage
• After 10000 operating hours	• Check torsional play • Visually check the elastic annular gear
• after 25 000 - 30 000 hours of operation	• Renew the anti-friction bearing grease • Replace oil seal (do not install it in the same track) • Change the elastic annular gear

7.5 Adapter AR

Time interval	What do I do?
• Every 3000 operating hours, at least every 6 months	• Check running noise for possible bearing damage • Visually check the adapter for leakage
• after 25 000 - 30 000 hours of operation	• Renew the anti-friction bearing grease • Replace oil seal (do not install it in the same track)

Unit/unit part	Time interval	What do I do?	Chapter
Adapter with torque limiting coupling	The periods of wear are affected by many factors and may be short. At least every **3000** operating hours	Inspect and – if necessary – replace the friction lining and cup springs, adjust the slip torque if necessary	See "Inspection/maintenance of the drive with AR torque limiting coupling"

Replace the friction lining if it lost more than 50% of its original thickness (see following table)

New brake disk:

Type	Friction lining thickness [mm]
AR71 / AR80 / AR85 / AR90 / AR95	2
AR100 / AR105 / AR112	3
AR132 / AR135 / AR145 / AR160 / AR165 / AR180 / AR185 / AR195	4

Setting tool dimensions

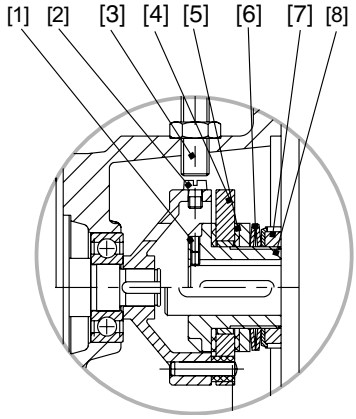
Type	d [mm]	l [mm]	u [mm]	t_{max} [mm]
AR71	14	30	5	16.3
AR80 / AR85	19	40	6	21.8
AR90 / AR95	24	50	8	27.3
AR100 / AR105 / AR112	28	60	8	31.3
AR132 / AR135 / AR145	38	80	10	41.3
AR160 / AR165	42	110	12	45.3
AR180 / AR185 / AR195	48		14	51.8

7.5.1 Required tools/resources

- Standard tools
- Hook spanner
- Hydraulic press
- Puller/extractor (threaded spindle with diameter like gear unit input shaft)
- Torque wrench

7.5.2 Inspecting/changing the friction lining, adjusting the slip torque

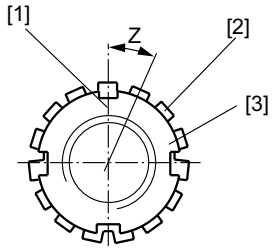
It is only possible to check and adjust the slip torque accurately by using a torque wrench with an appropriate connection piece. See table for the setting values.



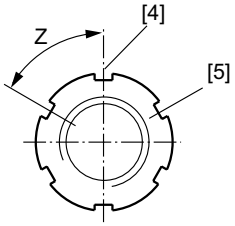
[1] Safety screw
[2] Cylinder head screw
[3] Proximity switch
[4] Friction disk
[5] Friction lining
[6] Cup spring
[7] Slotted nut
[8] Friction hub

The following figure shows the rough torque adjustment

AR71-115



AR132-195



[1] Marking
[2] Lock washer (cam)
[3] Slotted nut
[4] Markings (driving disk)
[5] Slotted nut

⚠ HAZARD!

Risk of crushing if the drive starts up unintentionally.

Severe or fatal injuries.

- Disconnect the gearmotor from the power supply before starting work and protect it against unintentional re-start.

1. Disconnect the motor/variable speed geared motor from the adapter
2. Unscrew the safety screw [1], pull the friction hub [8] off the shaft extension
3. Clamp the friction hub [8] in a vise
4. **With AR 71-115:** Unscrew the lock washer [2]

   With AR 132-195: Unscrew the clamping screw on the slotted round nut [7]
5. Unscrew the slotted round nut somewhat until you can easily adjust the torque limiting coupling by hand
6. **With AR 71-115:** Mark the position of the slotted round nut [3]

   With AR 132-195: Mark the driving disk [4]
7. Unscrew and remove the slotted round nut, remove the cup springs [6]

   Note: Note the sequence of the cup springs!
8. Inspect the friction lining [5]: change them if they are worn

   Note: Do not allow any lubricants to get onto the friction surface – this will irreparably damage the surface!
9. Inspect the cup springs [6]: change them if they are burned out
10. Reinstall the cup springs [6] (in the same sequence as before)
11. Screw on the slotted round nut up to the mark
12. Measuring/setting

    with a torque wrench

    - Connect the torque wrench to the hole in the hub
    - Measure the torque (in both directions), if necessary readjust using the slotted round nut

    Rough setting without torque wrench

    - Use the hook spanner to set the torque limiting coupling
    - Slip torque according to value Z" (see the following table), calculated from the marking

    with AR 71-115: = Number of cams of the lock washer

    with AR 132-195: = Number of slots in the slotted round nut
13. Secure the slotted round nut with the lock washer/clamping screw
14. Assemble the drive in reverse order

Slip torques AR

Adapter type	Cup springs			Setting range	No. of cams or slots "Z"																				
	Number	Thickness mm	Fig.[1)]	Nm	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
					Slip torque M_R in Nm																				
AR71	4	0.6	1	1.0-2.0						1.0	1.4	1.6	1.8	2.0											
			2	2.1-4.0						2.1	-	2.4	2.6	3.2	3.4	3.8	4								
	3		3	4.1-6.0			4.1	5.0	5.8	6.0															
AR80	4	0.6	1	1.0-2.0						1.0	1.4	1.6	2.8	2.0											
			2	2.1-4.0						2.1	-	2.4	2.6	3.2	3.4	3.8	4.0								
	3		3	4.1-6.0			4.1	5.0	5.8	6.0															
	4	0.9	2	6.1-16				6.0	8.0	9.0	10	11	12	13	14	15	16								
AR85 AR90 AR95	4	0.6	2	2.0-4.0				2.0	2.4	3.0	3.6	3.8	4.0												
	3		3	4.1-6.0			4.1	5.0	5.8	6.0															
	4	0.9	2	6.1-16				6.0	8.0	9.0	10	11	12	13	14	15	16								
	2	1.1	3	17-24			16	20	24																
AR100 AR105 AR112 AR115	6	0.7	2	5.0-13							5.0	6.0	8.0	9.0	10	11	12	13							
	2	1.45	2	14-35						14	16	17	18	20	22	23	24	26	27	28	-	30	31	32	35
			3	36-80						36	41	45	48	54	58	60									
AR132S/M AR132ML AR135 AR145	4	1.5	1	15-32				15	18	22	24	26	-	28	30	32									
			2	33-65			33	40	50	58	67														
			3	66-130		68	100	120	135																
AR160	4	1.5	1	30-45										32	36	38	40	41	42	40	44	45			
			2	46-85			46	48	60	65	70	75	80	85											
	2	2.7	2	86-200					86	90	110	125	135	150	160	180	190	200							
AR165 AR180 AR185 AR195	4	1.5	1	30-45										32	36	38	40	41	42	44	45				
			2	46-85			40	48	60	65	70	75	80	85											
	2	2.7	2	86-200					86	90	110	125	135	150	160	170	180	190	200						
			3	201-300			200	280	300																

1) For sequence of cup springs, refer to the legend below

Key

Fig.1	Double alternating sequence	()()
Fig.2	Alternating sequence	()
Fig.3	Aligned sequence	))

7.5.3 Replacing the encoder of the adapter

⚠ HAZARD!

Risk of crushing if the drive starts up unintentionally.

Severe or fatal injuries.

- Disconnect the gearmotor from the power supply before starting work and protect it against unintentional re-start.

1. Remove the fan guard from the driving motor
2. Remove the encoder connection
3. Unscrew the lock nut on the encoder and remove the old encoder
4. install new encoder. See section "Installing the voltage encoder" (see page 79).
5. Connect the encoder to the speed/slip monitor
6. Install the fan guard

NOTE

Use only OEM spare parts according to the delivered spare parts lists.

7.6 Inspection/maintenance for the AD input cover

Time interval	What do I do?
• Every 3000 operating hours, at least every 6 months	• Check running noise for possible bearing damage • Visually check the adapter for leakage
• after 25 000 - 30 000 hours of operation	• Renew the anti-friction bearing grease
	• Replace the oil seal

7.7 Inspection/maintenance for the gear unit

7.7.1 Checking the oil level and changing the oil

The procedure when checking the oil level and changing the oil depends on the following factors:

- Gear unit type
- Size
- Mounting position

Observe the references to the respective sections as well as the following table. Refer to chapter "Mounting Positions" (see page 106) for notes on the mounting positions.

Code letter	Section "Checking the oil level and changing the oil"	Reference
A:	• Helical gear units... • Parallel shaft helical gear units... • Helical-bevel gear units... • Helical-worm gear units... **With oil level plug**	(see page 90)
B :	• Helical gear units... • Parallel shaft helical gear units... • SPIROPLAN® gear units... **without oil level plug, with cover plate**	(see page 93)
C:	• S37... helical-worm gear units **without oil level plug and cover plate**	(see page 97)
D:	• SPIROPLAN® W37... **in mounting positions: M1, M2, M3, M5, M6 with oil level plug**	(see page 100)
E:	• SPIROPLAN® W37... **in M4 mounting position without oil level plug and cover plate**	(see page 97)

Series	Gear unit	Code letter for section "Checking the oil level and changing the oil"					
		M1	M2	M3	M4	M5	M6
R	R07...R27	B					
	R47...R57	A				B	A
	R57...R167	A					
	RX57...R107	A					
F	F27	B					
	F37..F157	A					
K	K37...K187	A					
S	S37	C					
	S47...S97	A					
W	W10...W30	B					
	W..37	D			E	D	

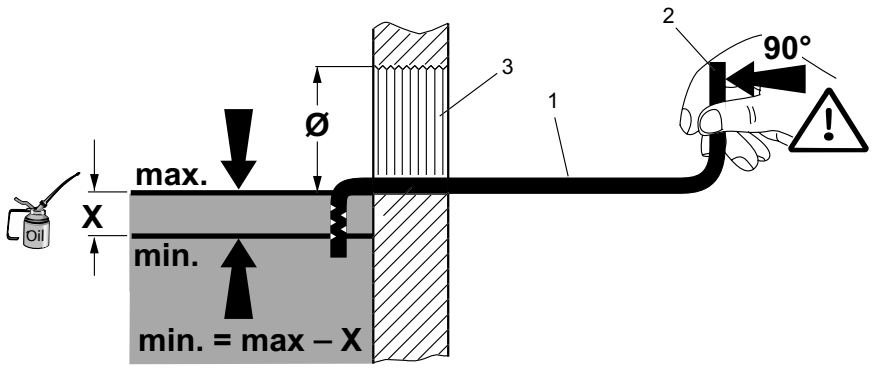
7.7.2 Helical, parallel shaft helical, helical-bevel and helical-worm gear units with oil level plug

Checking the oil level via the oil level plug

	CAUTION!
	The multi-stage gear units series: • R../R.. in mounting positions M1 and M2 • S../R.. in mounting position M3 have require a higher oil level for sufficient lubrication. This is why the provided oil level plugs must not be used. **Contact SEW-EURODRIVE!**

Proceed as follows to check the oil level of the gear unit:

- Observe the notes in section "Preliminary work regarding gear unit inspection/ maintenance" (see page 81).
- Determine the position of the oil level plug and the breather valve using the mounting position sheets. See chapter "Mounting Positions" (see page 106).
- Place a container underneath the oil level plug.
- Slowly remove the oil level plug. Small amounts of oil may leak out.
- Check the oil level via the oil level bore (3) with the provided oil dipstick (1).
- For the measurement, make sure that the **auxiliary clip (2)** of the oil dipstick (1) **always points up vertically** (see following figure).



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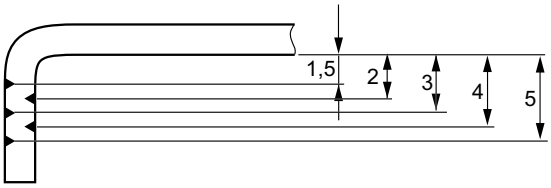
Max. fill level (max.): Lower edge of the oil level bore (3)

Minimum fill level (min.): Maximum fill level (max.) less the value "x" depending on diameter (∅) of oil-level bore 3 (see following table).

∅ Oil level bore	Minimum fill level = x [mm] = Check mark on oil dipstick
M10 x 1	1.5
M12 x 1.5	2
M22 x 1.5	3
M33 x 2	4
M42 x 2	5

The correct minimum fill level according to the table (value "x") corresponds to the check marks on the oil dipstick (see following figure).



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- Proceed as follows if the oil level is too low:
  - Remove the breather valve.
  - Fill in oil of the same type via the vent hole.
  - Re-insert the breather valve.
- Re-insert the oil level plug.

Checking the oil via the oil drain plug

Proceed as follows to check the oil of the gear unit:

1. Observe the notes in section "Preliminary work regarding gear unit inspection/maintenance" (see page 81).
2. Determine the position of the oil drain plug using the mounting position sheets. See chapter "Mounting Positions" (see page 106).
3. Remove a little oil from the oil drain plug.
4. Check the oil consistency.
   - Viscosity
   - If you can see that the oil is heavily contaminated, we recommend that you change the oil even if this is outside the service intervals specified in "Inspection and maintenance intervals" (see page 82).
5. Check the oil level.

Changing the oil via the oil drain plug and the breather valve

⚠ WARNING!

Danger of burns due to hot gear unit and hot gear unit oil.

Fatal injuries.

- Let the gear unit cool down before you begin with your work!
- However, the gear unit must still be warm otherwise the high viscosity of excessively cold oil will make it harder to drain the oil correctly.

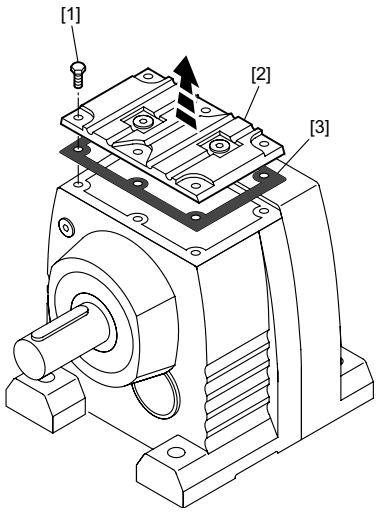
1. Observe the notes in section "Preliminary work regarding gear unit inspection/maintenance" (see page 81).
2. Determine the position of the oil drain plug, the oil level plug and the breather valve using the mounting position sheets. See chapter "Mounting Positions" (see page 106).
3. Place a container underneath the oil drain plug.
4. Remove the oil level plug, the breather valve and the oil drain plug.
5. Drain all the oil.
6. Re-insert the oil drain plug.
7. Fill in new oil of the same type via the vent hole (otherwise consult the customer service). Do not mix synthetic lubricants.
   - Fill the oil according to the quantity specified on the nameplate.
   - Check the oil level at the oil level plug.
8. Re-insert the oil level plug and the breather valve.

7.7.3 Helical, parallel shaft helical, SPIROPLAN® gear units without oil level plug with cover plate

Checking the oil level via the cover plate

For gear units without oil level bore, the oil level is checked via the cover plate opening. Proceed as follows:

1. Observe the notes in section "Preliminary work regarding gear unit inspection/maintenance" (see page 81).
2. For the cover plate to be on top, you have to set up the gear unit in the following mounting position.
   - R07 - R57 in M1 mounting position
   - F27 in M3 mounting position
   - W10 - W30 in M1 mounting position
3. Loosen the screws [1] of the cover plate [2] and remove the cover plate [2] and the corresponding seal [3] (see following figure).



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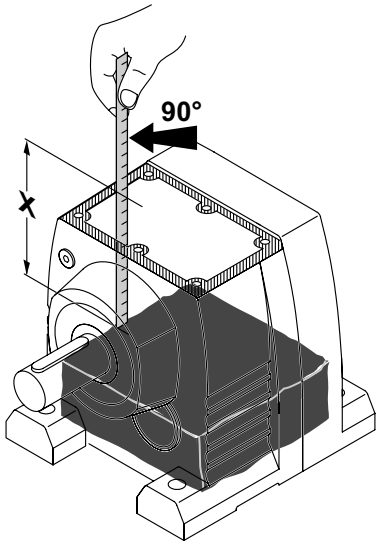
4. Determine the vertical distance "x" between oil level and sealing surface of the gear unit housing (see following figure).



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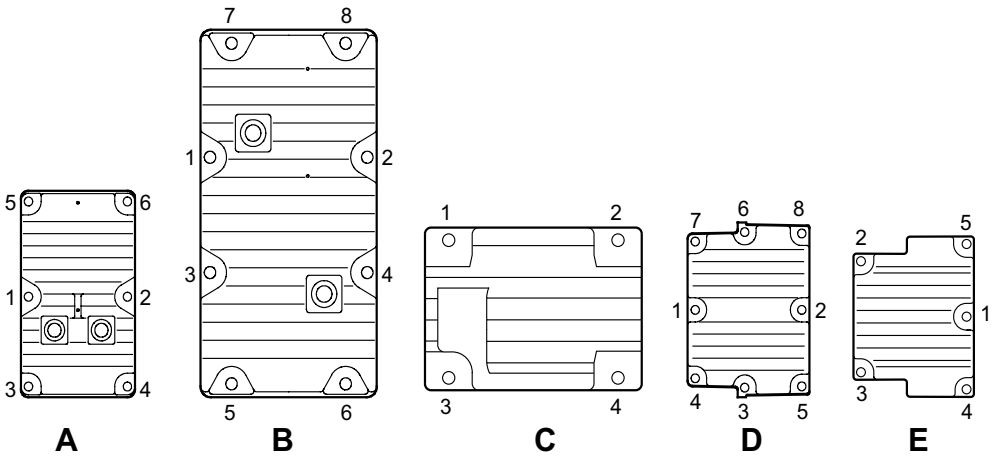
5. Compare the determined value "x" to the max. distance between oil level and sealing surface of the gear unit housing specified in the following table. Adjust the fill level if required.

Gear unit type		Max. distance x [mm] between oil level and sealing surface of the gear unit housing for mounting position					
		M1	M2	M3	M4	M5	M6
R07	2 stages	52 ± 1	27 ± 1	27 ± 1	27 ± 1	27 ± 1	27 ± 1
	3 stages	49 ± 1	21 ± 1	21 ± 1	21 ± 1	21 ± 1	21 ± 1
R17	2 stages	63 ± 1	18 ± 1	46 ± 1	18 ± 1	46 ± 1	46 ± 1
	3 stages	58 ± 1	11 ± 2	40 ± 2	11 ± 2	40 ± 2	40 ± 2
R27	2 stages	74 ± 1	22 ± 1	45 ± 1	22 ± 1	45 ± 1	45 ± 1
	3 stages	76 ± 1	19 ± 1	42 ± 1	19 ± 1	42 ± 1	42 ± 1
R47	2 stages	–	–	–	–	39 ± 1	–
	3 stages	–	–	–	–	32 ± 1	–
R57	2 stages	–	–	–	–	32 ± 1	–
	3 stages	–	–	–	–	28 ± 1	–
F27	2 stages	78 ± 1	31 ± 1	72 ± 1	56 ± 1	78 ± 1	78 ± 1
	3 stages	71 ± 1	24 ± 1	70 ± 1	45 ± 1	71 ± 1	71 ± 1
		irrespective of the mounting position					
W10		12 ± 1					
W20		19 ± 1					
W30		31 ± 1					

6. Close the gear unit after the oil level check:
   - Re-attach the seal of the cover plate. Make sure that the sealing surfaces are clean and dry.
   - Screw on the cover plate. Tighten the cover screws with the rated tightening torque according to the following table from the inside to the outside in the order illustrated in the figure. Repeat the tightening procedure until the screws are properly tightened. Only use impulse drivers or torque wrenches in order to prevent the cover plate from being damaged (no impact drivers).



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Gear unit type	Illus tra-tion	Retaining thread	Rated tightening torque T_N [Nm]	Minimum tightening torque T_N [Nm]
R/RF07	E	M5	6	4
R/RF17/27	D	M6	11	7
R/RF47/57	A			
F27	B			
W10	C	M5	6	4
W20	C	M6	11	7
W30	A			

Checking the oil via the cover plate

Proceed as follows to check the oil of the gear unit:

1. Observe the notes in section "Preliminary work regarding gear unit inspection/maintenance" (see page 81).
2. Open the cover plate of the gear unit according to section "Checking the oil via the cover plate" (see page 93).
3. Take an oil sample via the cover plate opening.
4. Check the oil consistency.
   - Viscosity
   - If you can see that the oil is heavily contaminated, we recommend that you change the oil even if this is outside the service intervals specified in "Inspection and maintenance intervals" (see page 82).
5. Check the oil level.
6. Screw on the cover plate. Observe the order and the tightening torques according to section "Checking the oil level via the cover plate" (see page 93)

Checking the oil via the cover plate

⚠ WARNING!

Danger of burns due to hot gear unit and hot gear unit oil.

Fatal injuries.

- Let the gear unit cool down before you begin with your work!
- However, the gear unit must still be warm otherwise the high viscosity of excessively cold oil will make it harder to drain the oil correctly.

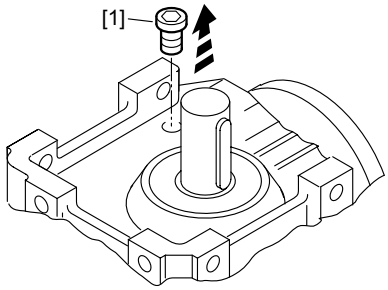
1. Observe the notes in section "Preliminary work regarding gear unit inspection/maintenance" (see page 81).
2. Open the cover plate of the gear unit according to section "Checking the oil via the cover plate" (see page 93).
3. Completely drain the oil in to a vessel via the cover plate opening.
4. Fill in new oil of the same type via the cover plate opening (otherwise consult the customer service). You must not mix different synthetic lubricants.
   - Oil quantity according to the nameplate.
5. Check the oil level.
6. Screw on the cover plate. Observe the order and the tightening torques according to section "Checking the oil level via the cover plate" (see page 93)

7.7.4 S37 helical-worm gear units without oil level plug and cover plate

Checking the oil level via the screw plug

The S37 gear unit is not equipped with an oil level plug or a cover plate. This is why the oil level is checked via the control bore.

1. Observe the notes in section "Preliminary work regarding gear unit inspection/maintenance" (see page 81).
2. Set up the gear unit in M5 or M6 mounting position, i.e. control bore always on top.
3. Remove the screw plug [1] (see following figure).



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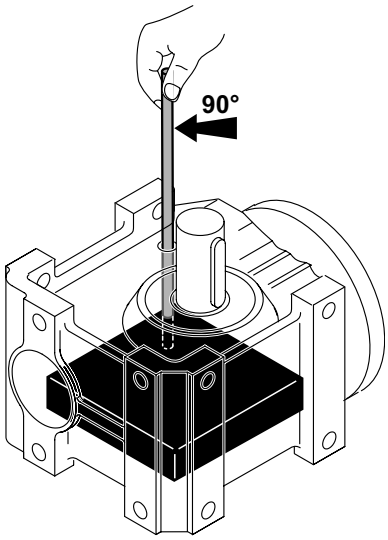
4. Insert the dipstick vertically via the control bore all the way to the bottom of the gear unit housing. Pull out the dipstick vertically (see following figure).



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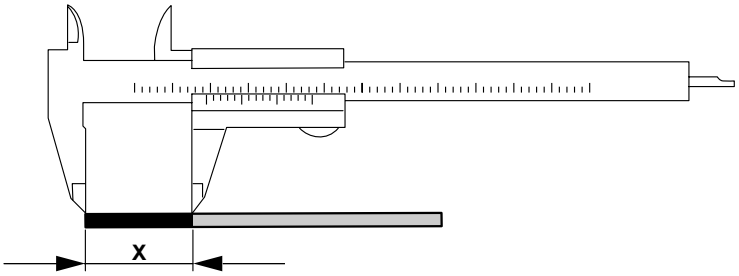
5. Determine the size of the section "x" of the dipstick covered with lubricant using a caliper (see following figure).



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6. Compare the determined value "x" to the min. value depending on the mounting position specified in the following table. Correct the fill level if required.

Gear unit type	Oil level = wetted section x [mm] of the dipstick Mounting position					
	M1	M2	M3	M4	M5	M6
S37	10 ± 1	24 ± 1	34 ± 1	37 ± 1	24 ± 1	24 ± 1

7. Re-insert and tighten the screw plug.

Checking the oil via the screw plug

1. Observe the notes in section "Preliminary work regarding gear unit inspection/maintenance" (see page 81).
2. Open the cover plate of the gear unit according to section "Checking the oil via the screw plug" (see page 97).
3. Take an oil sample via the screw plug bore.
4. Check the oil consistency.
   - Viscosity
   - If you can see that the oil is heavily contaminated, we recommend that you change the oil even if this is outside the service intervals specified in "Inspection and maintenance intervals" (see page 82).
5. Check the oil level.
6. Re-insert and tighten the screw plug.

Changing the oil via the screw plug

⚠ WARNING!

Danger of burns due to hot gear unit and hot gear unit oil.

Fatal injuries.

- Let the gear unit cool down before you begin with your work!
- However, the gear unit must still be warm otherwise the high viscosity of excessively cold oil will make it harder to drain the oil correctly.

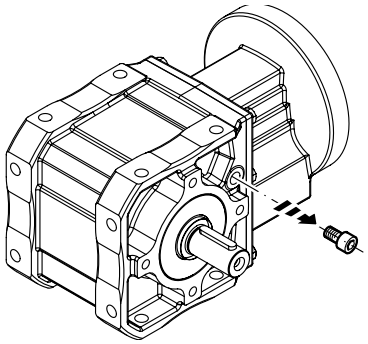
1. Observe the notes in section "Preliminary work regarding gear unit inspection/maintenance" (see page 81).
2. Open the cover plate of the gear unit according to section "Checking the oil via the screw plug" (see page 97).
3. Completely drain the oil via the screw plug bore.
4. Fill in new oil of the same type via the control bore (otherwise consult the customer service). You must not mix different synthetic lubricants.
   - Fill the oil according to the quantity specified on the nameplate.
5. Check the oil level.
6. Re-insert and tighten the screw plug.

7.7.5 SPIROPLAN® W37 in mounting positions: M1, M2, M3, M5, M6 with oil level plug

Checking the oil levelvia the oil level plug

Proceed as follows to check the oil level of the gear unit:

1. Observe the notes in section "Preliminary work regarding gear unit inspection/maintenance" (see page 81).
2. Set up the gear unit in M1 mounting position.
3. Slowly remove the oil level plug (see following figure). Small amounts of oil may leak out.



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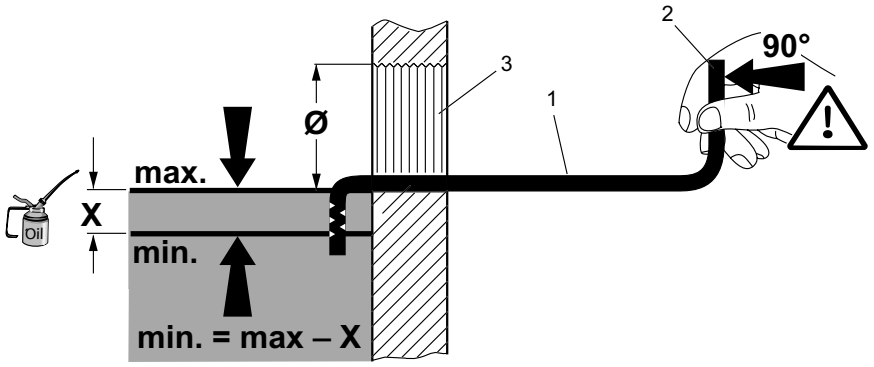
4. Check the oil level via the oil level bore (3) with the provided oil dipstick (1).
5. For the measurement, make sure that the **auxiliary clip (2)** of the oil dipstick (1) **always points up vertically** (see following figure).



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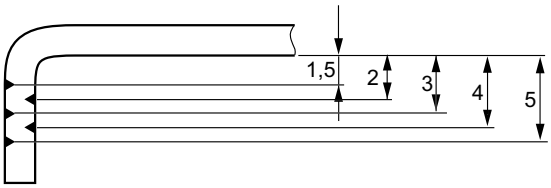
Max. fill level (max.): Lower edge of the oil level bore (3)

Minimum fill level (min.): Maximum fill level (max.) less the value "x" depending on diameter (∅) of oil-level bore 3 (see following table).

∅ Oil level bore	Minimum fill level = x [mm] = Check mark on oil dipstick
M10 x 1	1.5

The correct minimum fill level according to the table (value "x") corresponds to the check marks on the oil dipstick (see following figure).



6. If the oil level is too low, fill in new oil of the same type via the oil level bore until the oil level reaches the lower edge of the bore.
7. Re-insert the oil level plug.

Checking the oil via the oil level plug

Proceed as follows to check the oil of the gear unit:

1. Observe the notes in section "Preliminary work regarding gear unit inspection/maintenance" (see page 81).
2. Remove a little oil at the oil level plug.
3. Check the oil consistency.
   - Viscosity
   - If you can see that the oil is heavily contaminated, we recommend that you change the oil even if this is outside the service intervals specified in "Inspection and maintenance intervals" (see page 82).
4. Check the oil level.

Changing the oil via the oil level plug

⚠ WARNING!

Danger of burns due to hot gear unit and hot gear unit oil.

Fatal injuries.

- Let the gear unit cool down before you begin with your work!
- However, the gear unit must still be warm otherwise the high viscosity of excessively cold oil will make it harder to drain the oil correctly.

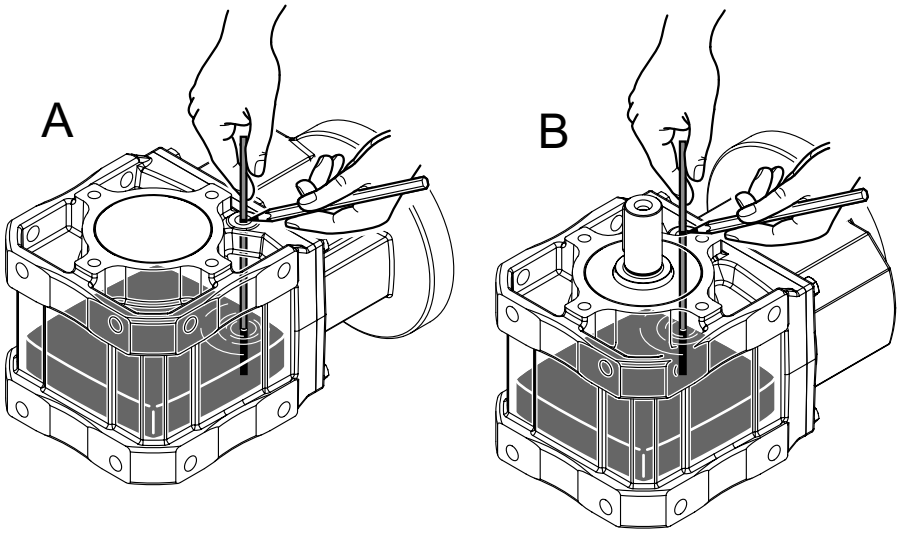
1. Observe the notes in section "Preliminary work regarding gear unit inspection/maintenance" (see page 81).
2. Set up the gear unit in M5 or M6 mounting position. See chapter "Mounting Positions" (see page 106).
3. Place a container underneath the oil level plug.
4. Remove the oil level plugs on the A and B side of the gear unit.
5. Drain all the oil.
6. Re-insert the lower oil level plug.
7. Fill in new oil of the same type via the upper oil level plug bore (otherwise consult the customer service). You must not mix different synthetic lubricants.
   - Fill the oil according to the quantity specified on the nameplate.
   - Check the oil level.
8. Re-insert the upper oil level plug.

7.7.6 SPIROPLAN® W37 in M4 mounting position without oil level plug and cover plate

Checking the oil level via the screw plug

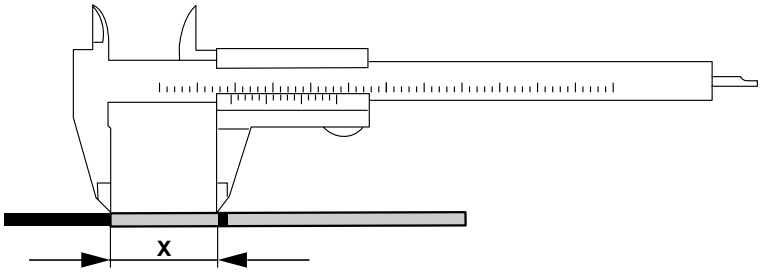
The W37 gear unit is not equipped with an oil level plug or a cover plate. This is why the oil level is checked via the control bore.

1. Observe the notes in section "Preliminary work regarding gear unit inspection/maintenance" (see page 81).
2. Set up the gear unit in M5 or M6 mounting position.
3. Remove the screw plug.
4. Insert the dipstick vertically via the control bore all the way to the bottom of the gear unit housing. Mark the point of the dipstick where it exits the gear unit. Pull out the dipstick vertically (see following figure).



784447371

5. Determine the section "x" between the wetted part and the marking using a caliper (see following figure).



785020811

6. Compare the determined value "x" to the min. value depending on the mounting position specified in the following table. Correct the fill level if required.

Gear unit type	Oil level = wetted section x [mm] of the dipstick Mounting position during the check	
	M5 Lying on the A side	M6 Lying on the B side
W37 in M4 mounting position	37 ± 1	29 ± 1

7. Re-insert and tighten the screw plug.

Checking the oil via the screw plug

Proceed as follows to check the oil of the gear unit:

1. Observe the notes in section "Preliminary work regarding gear unit inspection/maintenance" (see page 81).
2. Remove a little oil at the oil screw plug.
3. Check the oil consistency.
   - Viscosity
   - If you can see that the oil is heavily contaminated, we recommend that you change the oil even if this is outside the service intervals specified in "Inspection and maintenance intervals" (see page 82).
4. Check the oil level.

Changing the oil via the screw plug

⚠ WARNING!

Danger of burns due to hot gear unit and hot gear unit oil.

Fatal injuries.

- Let the gear unit cool down before you begin with your work!
- However, the gear unit must still be warm otherwise the high viscosity of excessively cold oil will make it harder to drain the oil correctly.

1. Observe the notes in section "Preliminary work regarding gear unit inspection/maintenance" (see page 81).
2. Set up the gear unit in M5 or M6 mounting position. See chapter "Mounting Positions" (see page 106).
3. Place a container underneath the screw plug.
4. Remove the screw plugs on the A and B side of the gear unit.
5. Drain all the oil.

6. Re-insert the lower screw plug.
7. Fill in new oil of the same type via the upper screw plug bore (otherwise consult the customer service). You must not mix different synthetic lubricants.
   – Fill the oil according to the quantity specified on the nameplate.
   – Check the oil level.
8. Re-insert the upper screw plug.

7.7.7 Replacing the oil seal

	CAUTION! Oil seals with a temperature below 0 °C may get damaged during installation. Potential damage to property. • Store oil seals at ambient temperatures over 0 °C. • Warm up the oil seals prior to installation if required.

1. When changing the oil seal, ensure that there is a sufficient grease reservoir between the dust lip and protective lip, depending on the type of gear unit.
2. If you use double oil seals, fill one-third of the gap with grease.

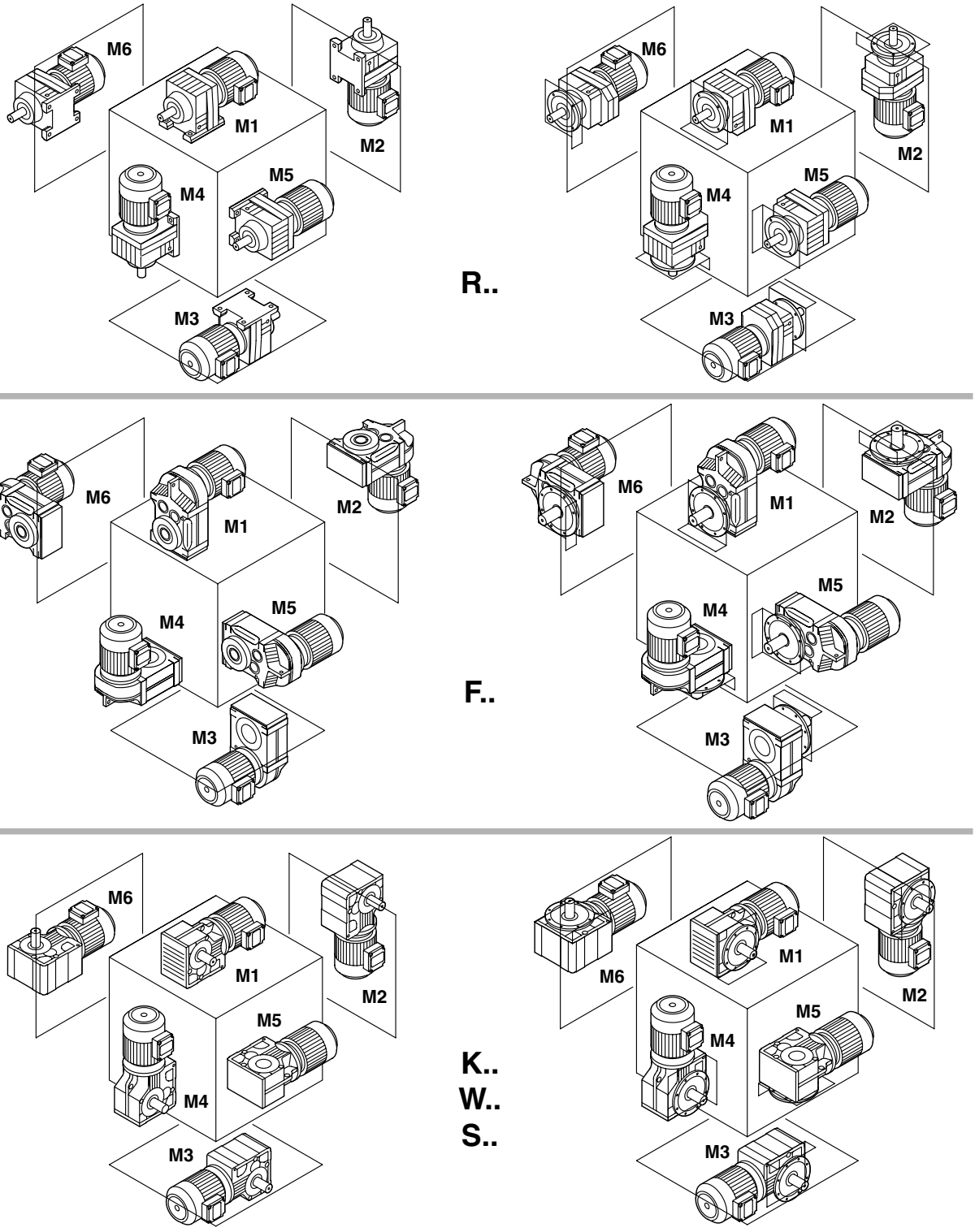
7.7.8 Painting gear units

	CAUTION! Breather valves and oil seals may be damaged during the painting or re-painting process. Potential damage to property. • Thoroughly cover the breather valves and the sealing lip of the oil seals with strips prior to the painting process. • Remove the strips after the process.

8 Mounting Positions

8.1 Designation of the mounting positions

SEW differentiates between the six mounting positions M1 ... M6. The following illustration shows the position of the gear unit in mounting positions M1 ... M6.



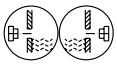
8.2 Key

	NOTE
	The SPIROPLAN® gearmotors are not dependent on the mounting position, except for W37 in M4 mounting position. However, mounting positions M1 to M6 are also shown for SPIROPLAN® gearmotors to assist you in working with this documentation.

Caution: Apart from W37, the SPIROPLAN® gearmotors cannot be equipped with breather valves, oil level plugs or drain plugs.

8.2.1 Symbols used

The following table shows the symbols used in the mounting position sheets and what they mean:

Symbol	Meaning
	Breather valve
	Oil level plug
	Oil drain plug

8.2.2 Churning losses

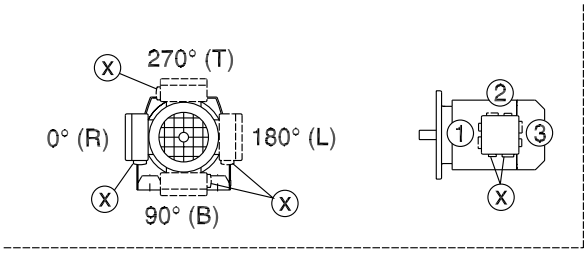
Churning losses may occur in some mounting positions. Contact SEW-EURODRIVE in case of the following combinations:

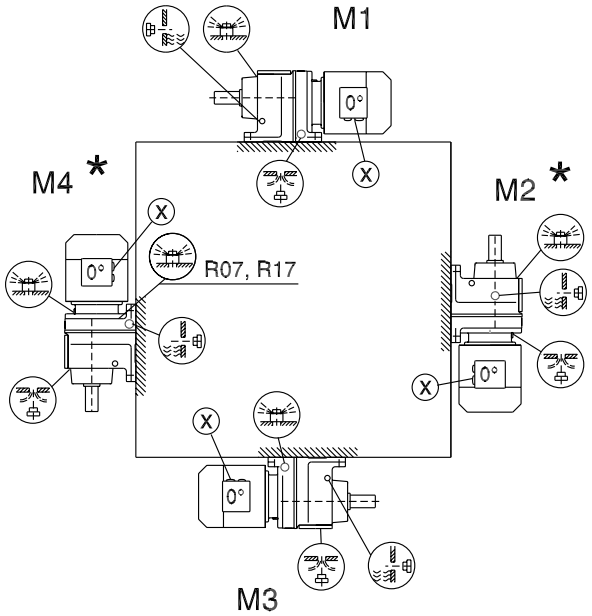
Mounting position	Gear unit type	Gear unit size	Input speed [rpm]
M2, M4	R	97 ... 107	> 2500
		> 107	>1500
M2, M3, M4, M5, M6	F	97 ... 107	> 2500
		> 107	> 1500
	K	77 ... 107	> 2500
		> 107	> 1500
	S	77 ... 97	> 2500

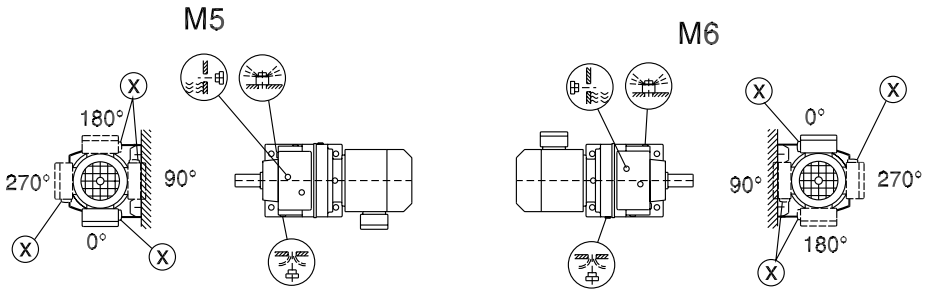
8.3 Helical gearmotors R

8.3.1 R07 ... R167

04 040 03 00



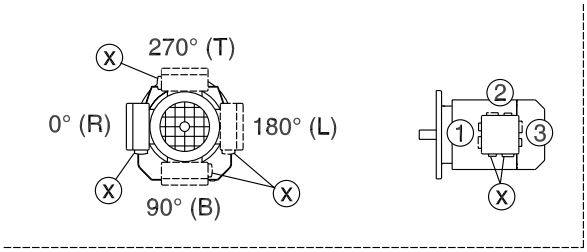


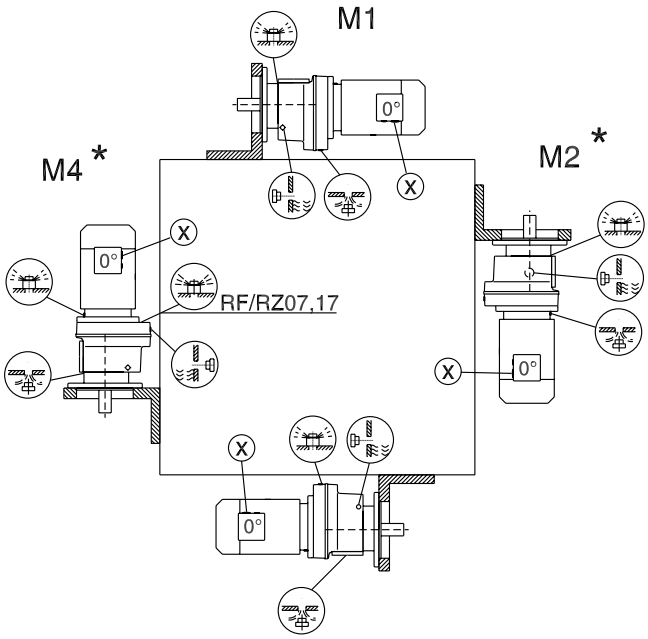


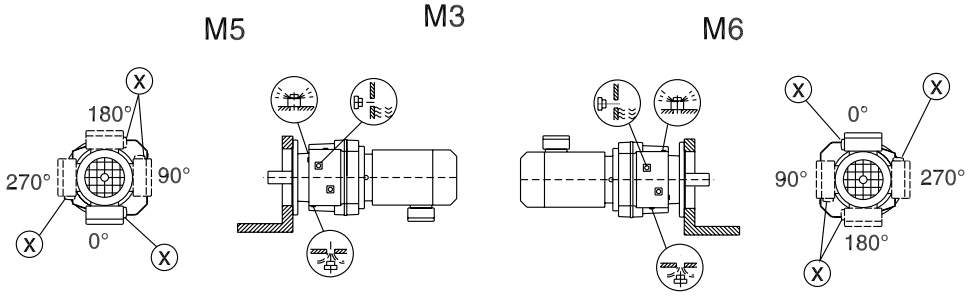
R07		M1, M2 , M3 , M5 , M6
R17, R27		M1, M3 , M5 , M6
R07, R17, R27		
R47, R57		M5

8.3.2 RF07 ... RF167, RZ07 ... RZ87

04 041 03 00



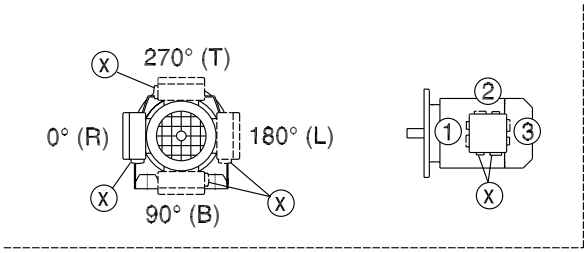


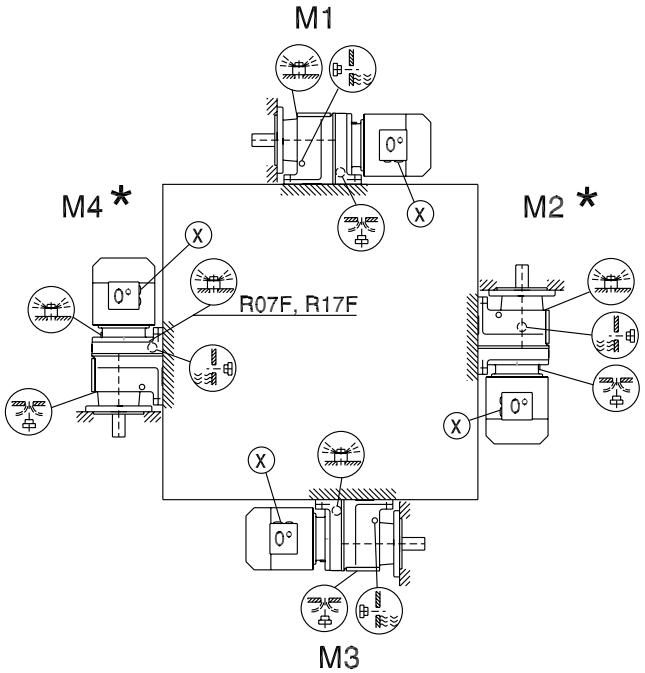


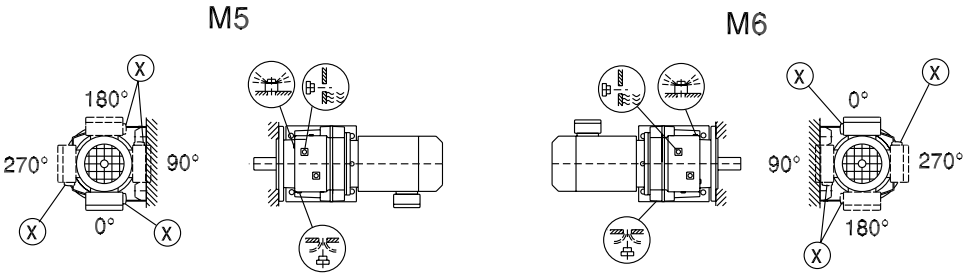
RF/RZ07		M1, M2 , M3 , M5 , M6
RF/RZ17,27		M1, M3 , M5 , M6
RF/RZ07, 17, 27		
RF/RZ47, 57		M5

8.3.3 R07F ... R87F

04 042 03 00





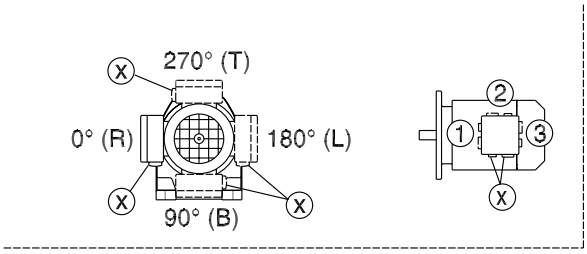


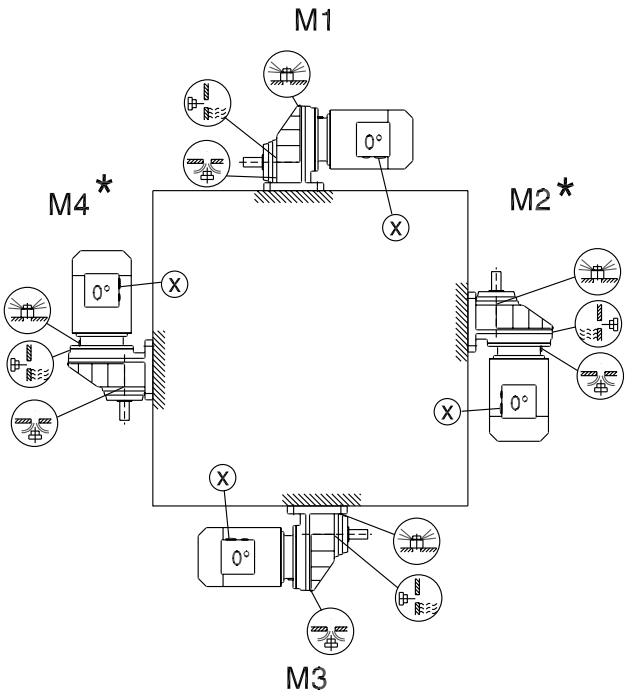
R07F		M1, M2 , M3 , M5 , M6
R17F, R27F		M1, M3 , M5 , M6
R07F, R17F, R27F		
R47F, R57F		M5

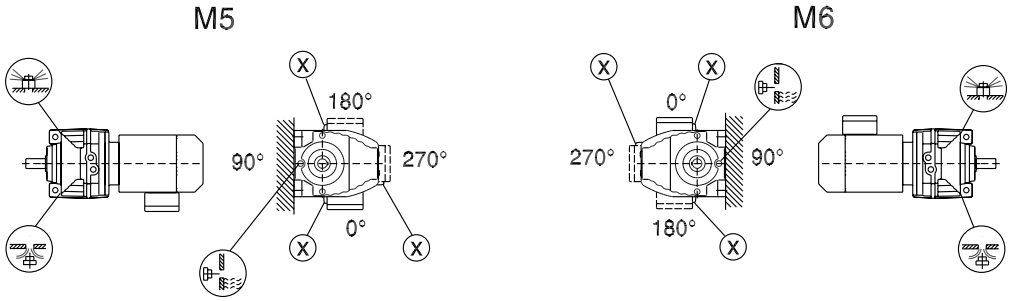
8.4 Helical gearmotors RX

8.4.1 RX57 ... RX107

04 043 02 00

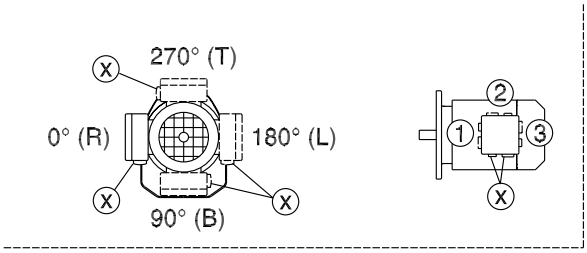


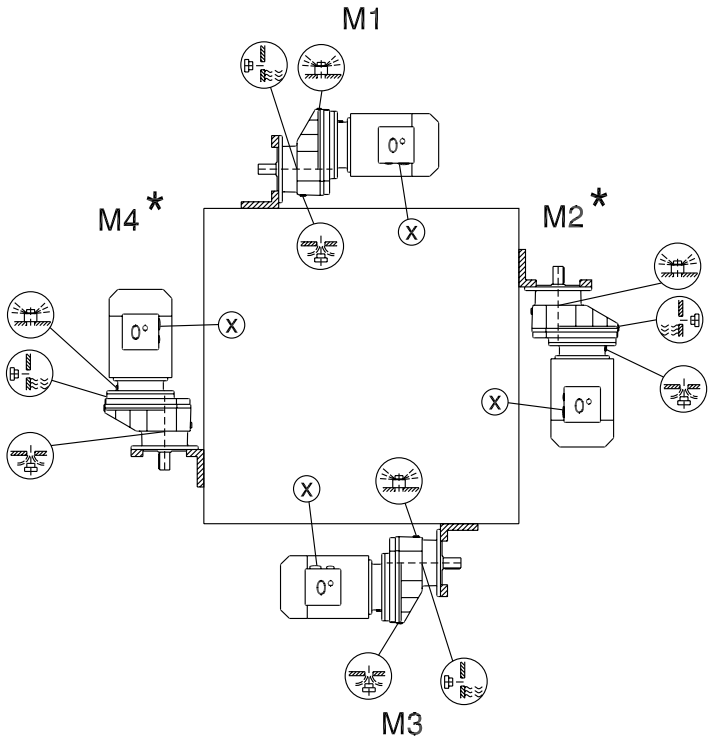


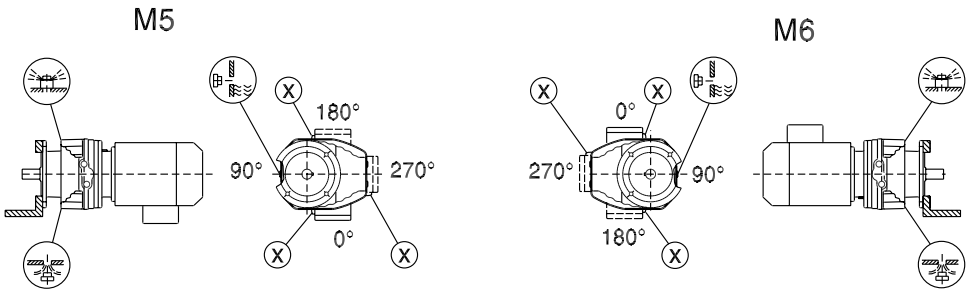


8.4.2 RXF57 ... RXF107

04 044 02 00



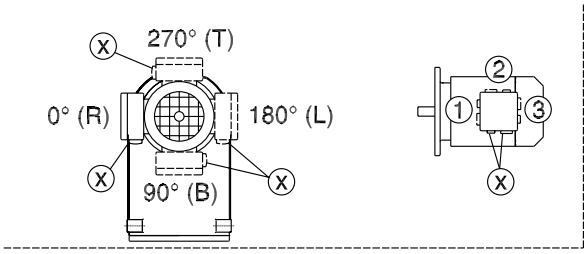


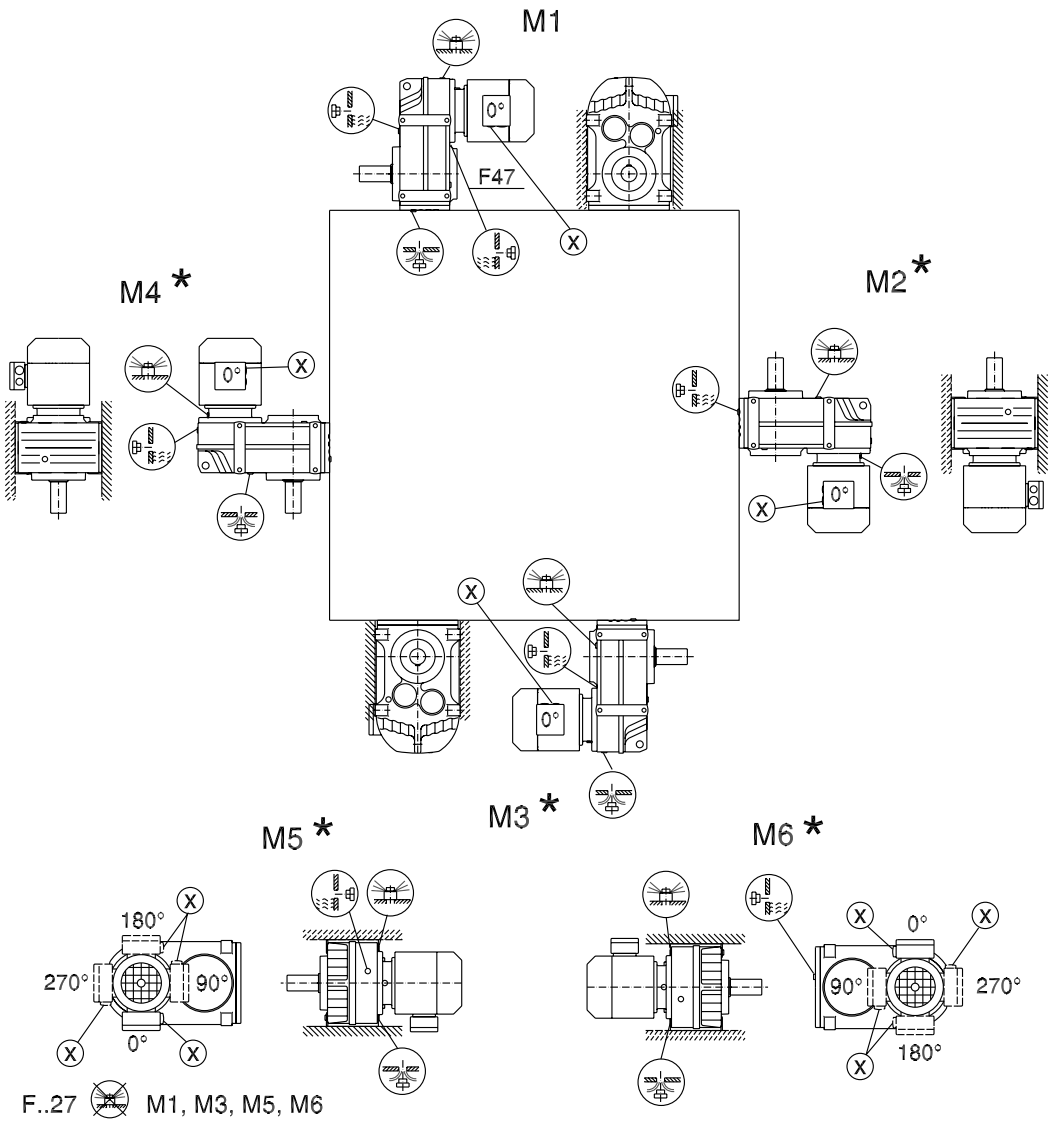


8.5 Parallel shaft helical gearmotors F

8.5.1 F27 ... F157 / FA27B ... F157B / FH27B .. FH157B / FV27B ... FV107B

42 042 03 00





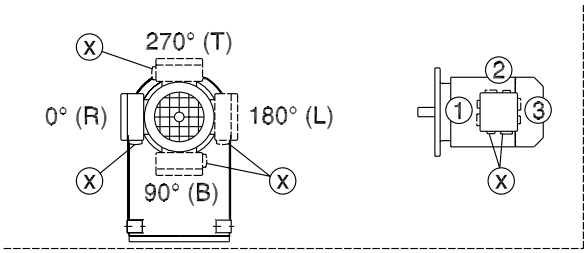
F..27 M1, M3, M5, M6

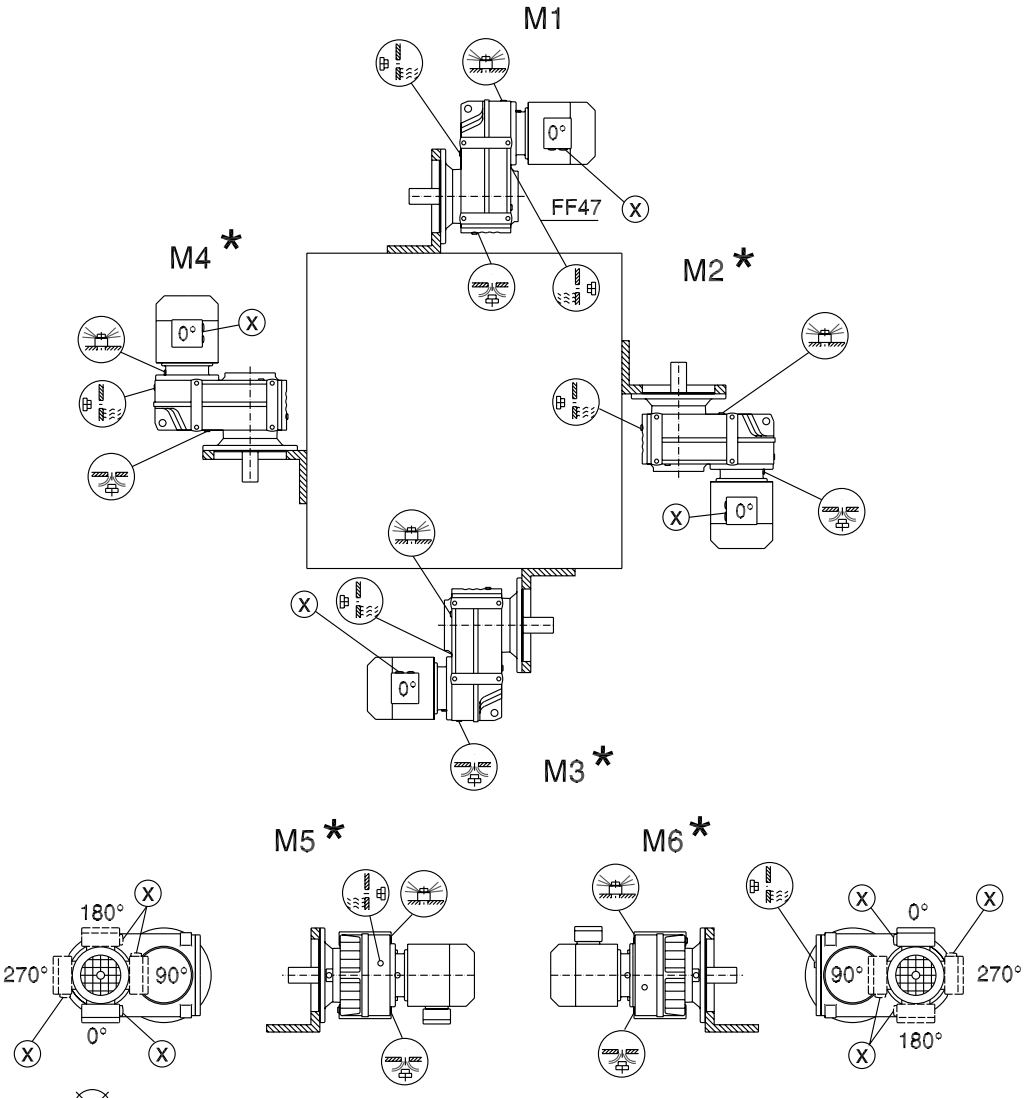
F..27 M1 - M6

F..27 M1, M3, M5, M6

8.5.2 FF27 ... FF157 / FAF27 ... FAF157 / FHF27 ... FHF157 / FAZ27 ... FAZ157 / FHZ27 ... FHZ157 / FVF27 ... FVF107 / FVZ27 ... FVZ107

42 043 03 00





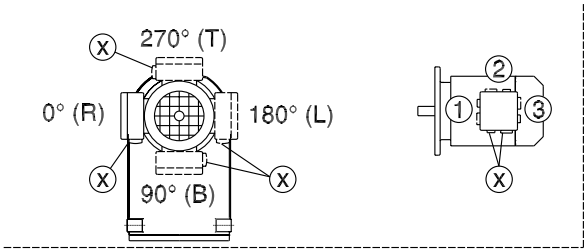
F..27 M1, M3, M5, M6

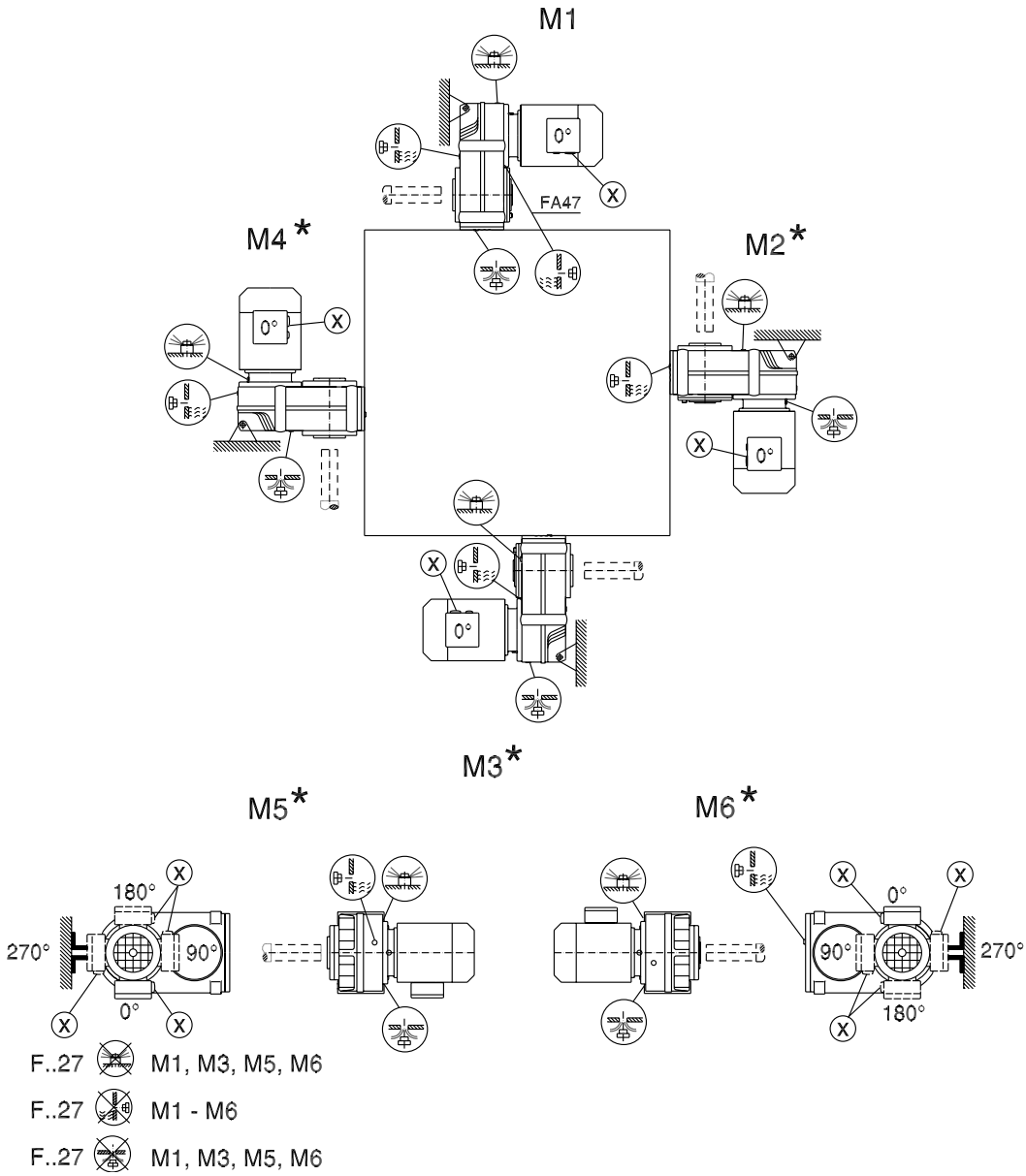
F..27 M1 - M6

F..27 M1, M3, M5, M6

8.5.3 FA27 ... FA157 / FH27 ... FH157 / FV27 ... FV107 / FT37 ... FT157

42 044 03 00

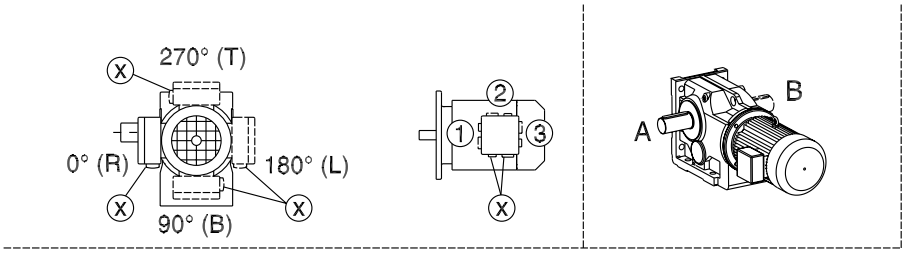


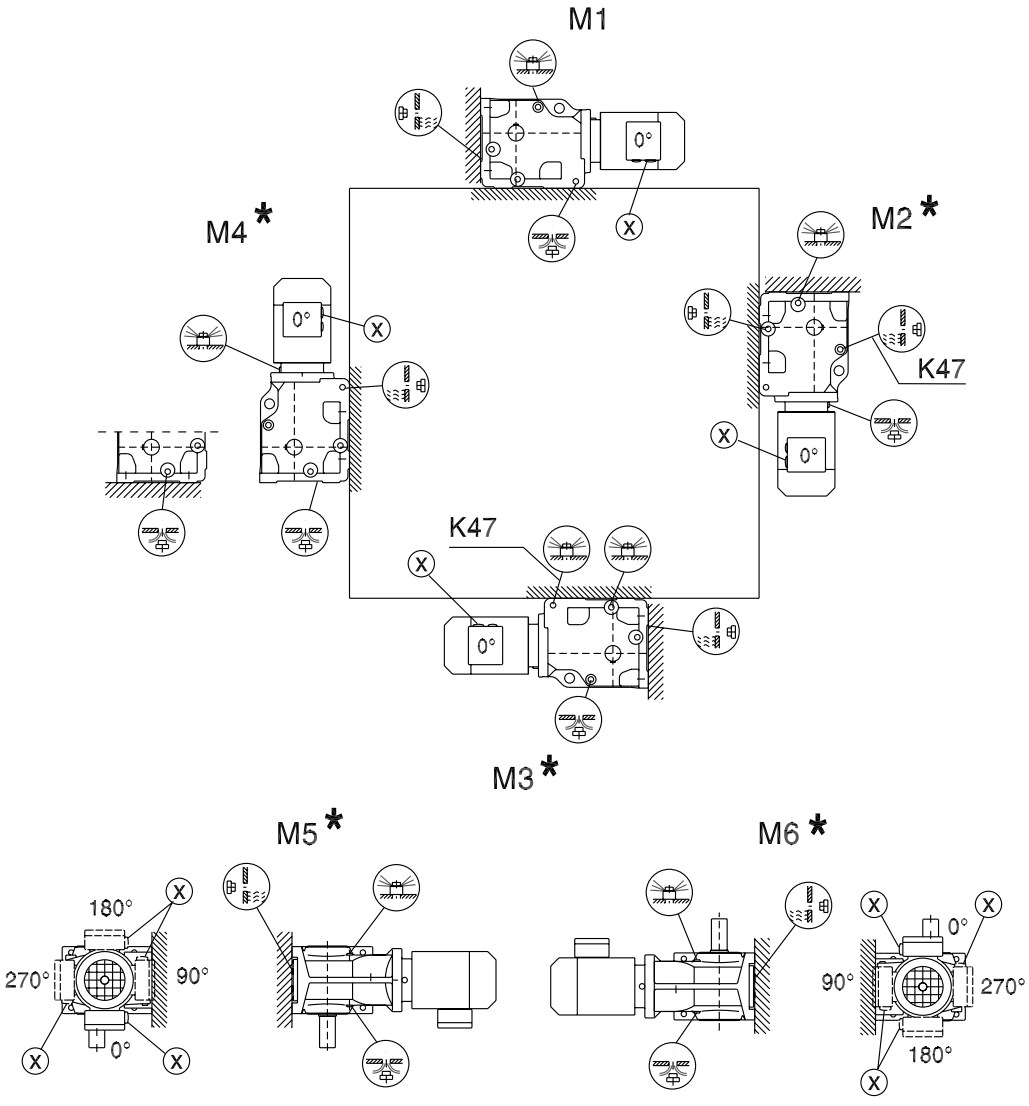


8.6 Helical-bevel gearmotors K

8.6.1 K37 ... K157 / KA37B ... KA157B / KH37B ... KH157B / KV37B ... KV107B

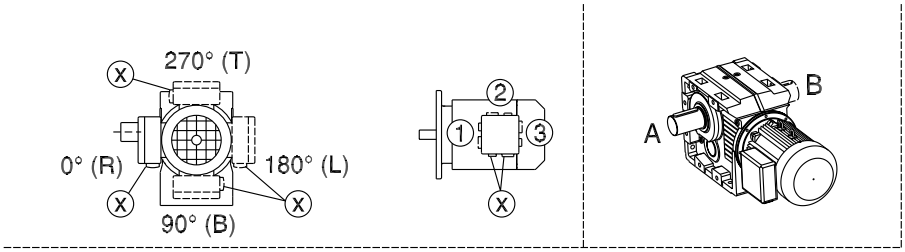
34 025 03 00

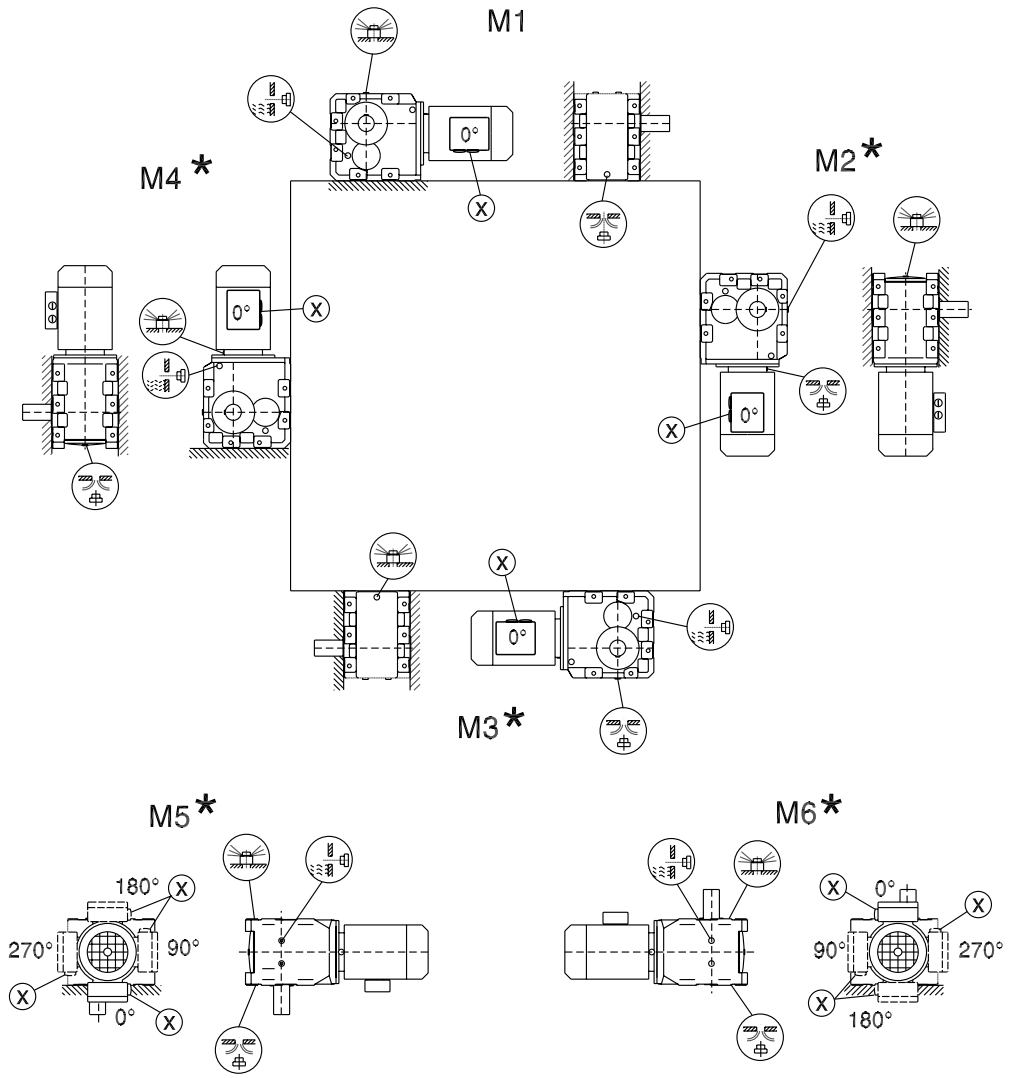




8.6.2 K167 ... K187 / KH167B ... KH187B

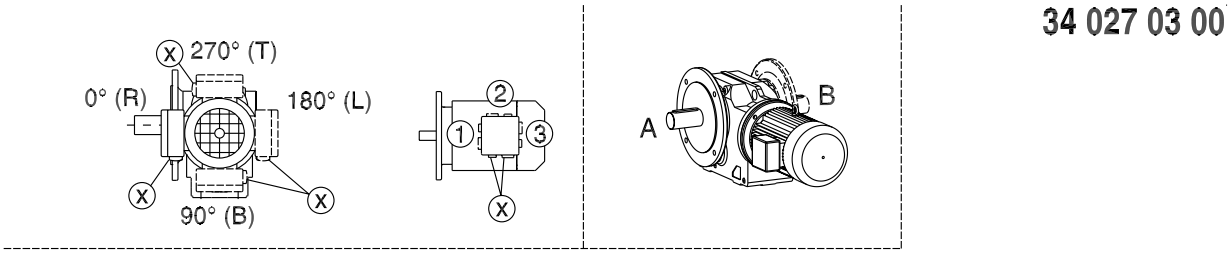
34 026 03 00

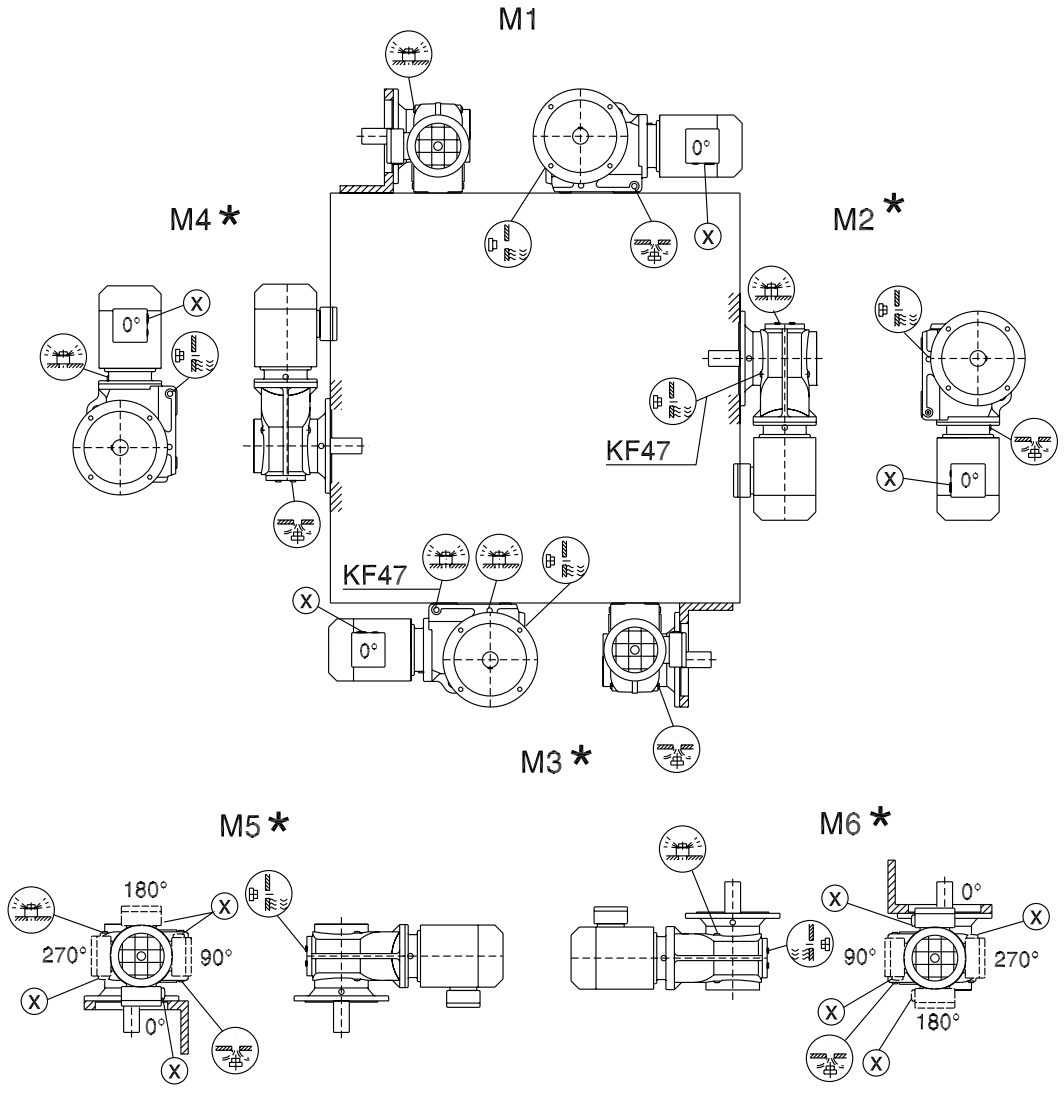




8.6.3 KF37 ... KF157 / KAF37 ... KAF157 / KHF37 ... KHF157 / KAZ37 ... KAZ157 / KHZ37 ... KHZ157 / KVF37 ... KVF107 / KVZ37 ... KVZ107

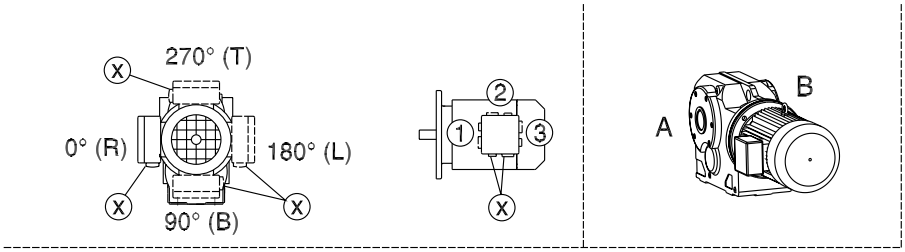
34 027 03 00

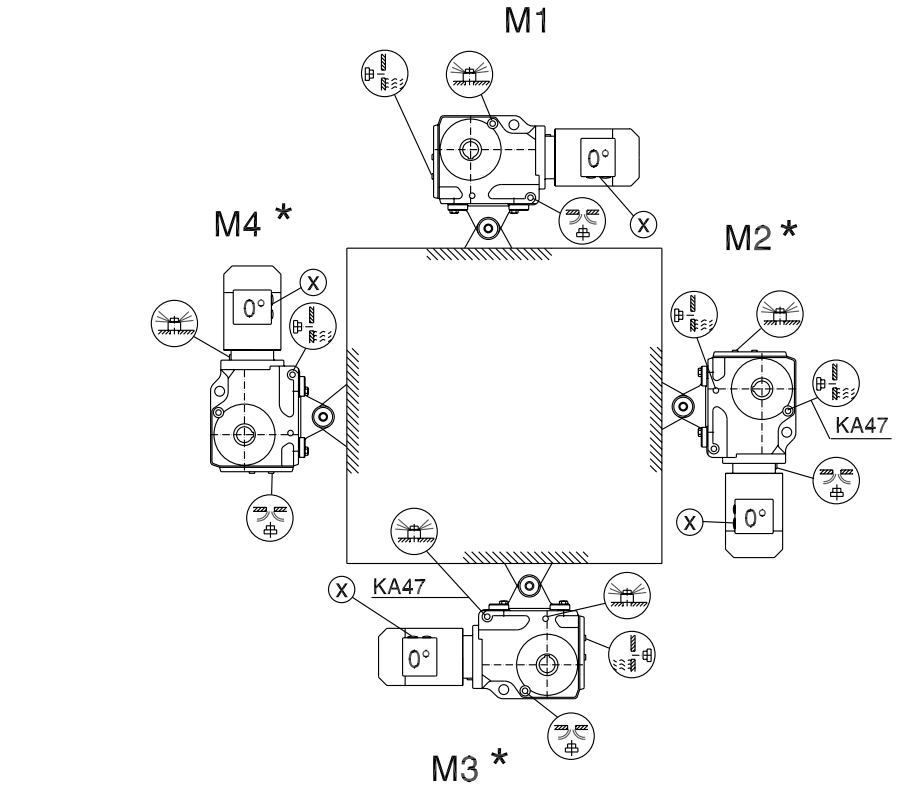


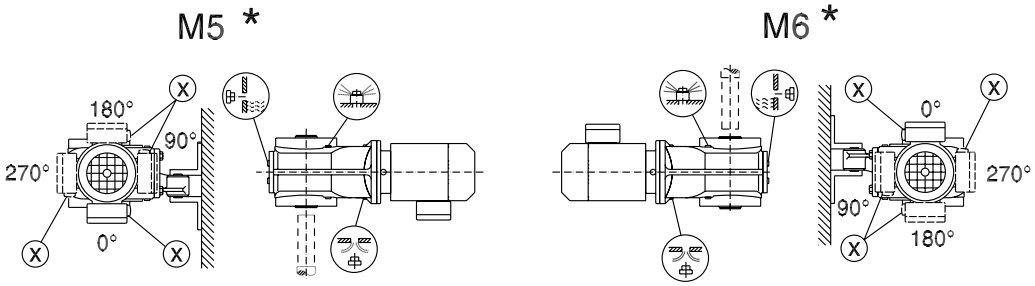


8.6.4 KA37 ... KA157 / KH37 ... KH157 / KV37 ... KV107 / KT37 ... KT157

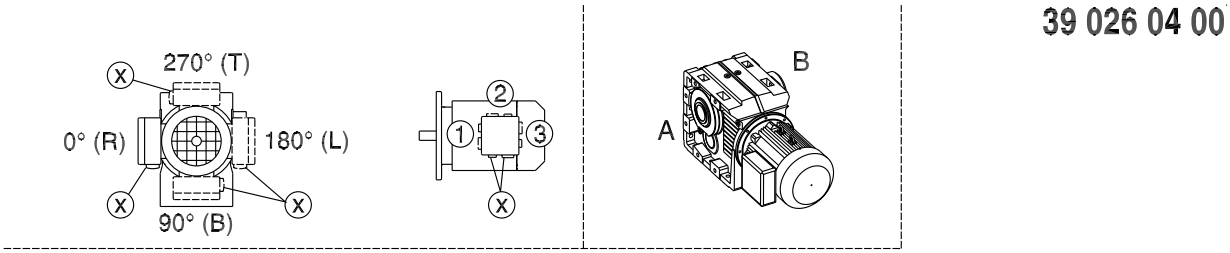
39 025 04 00

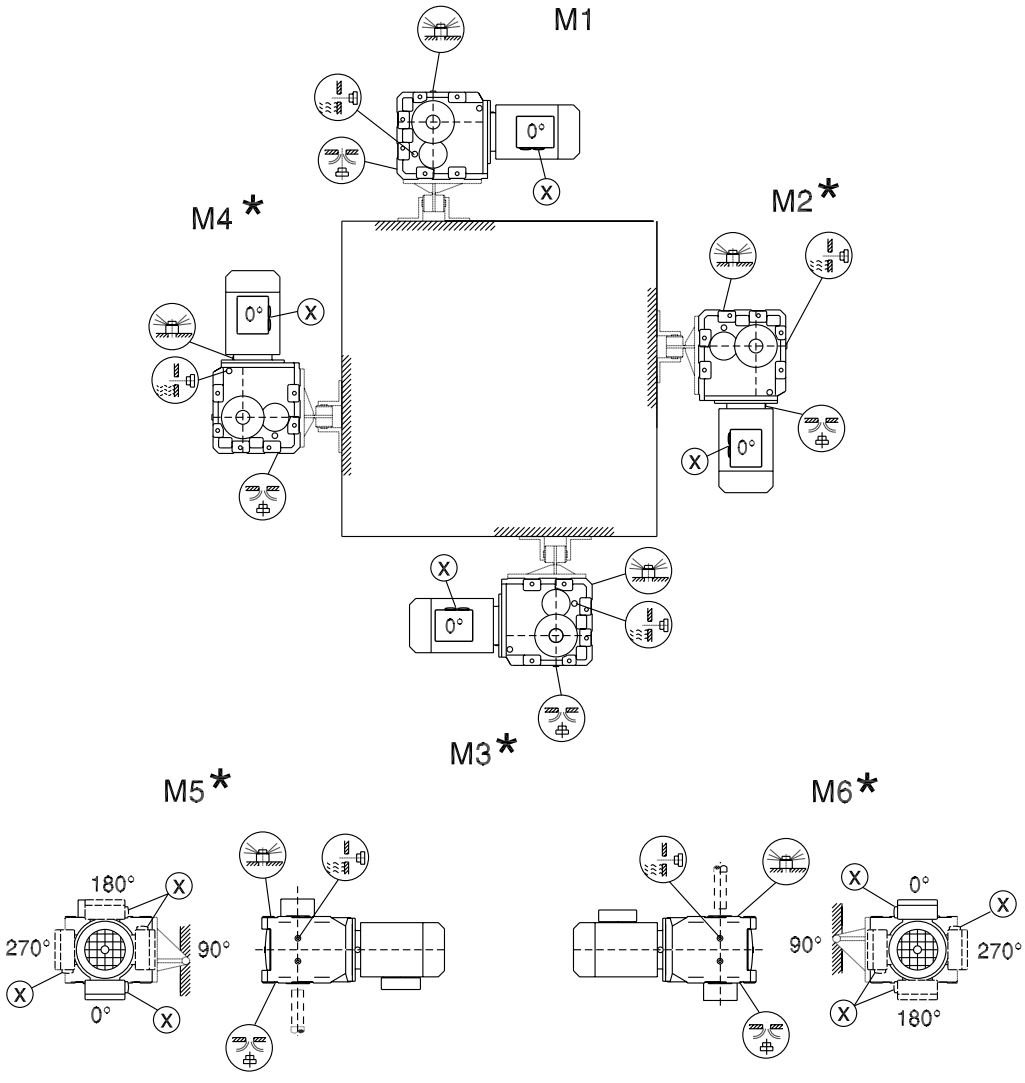






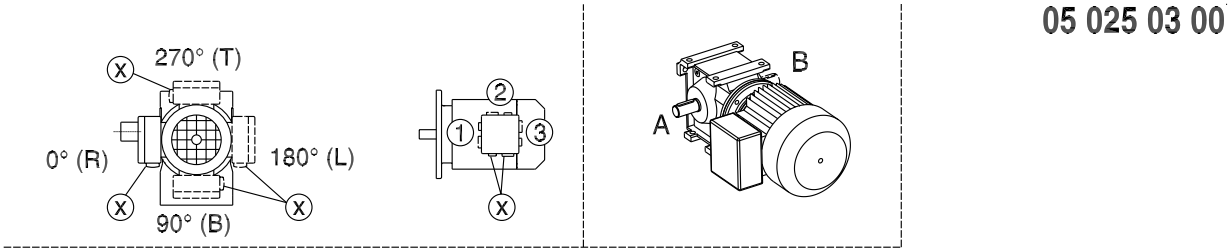
8.6.5 KH167 ... KH187

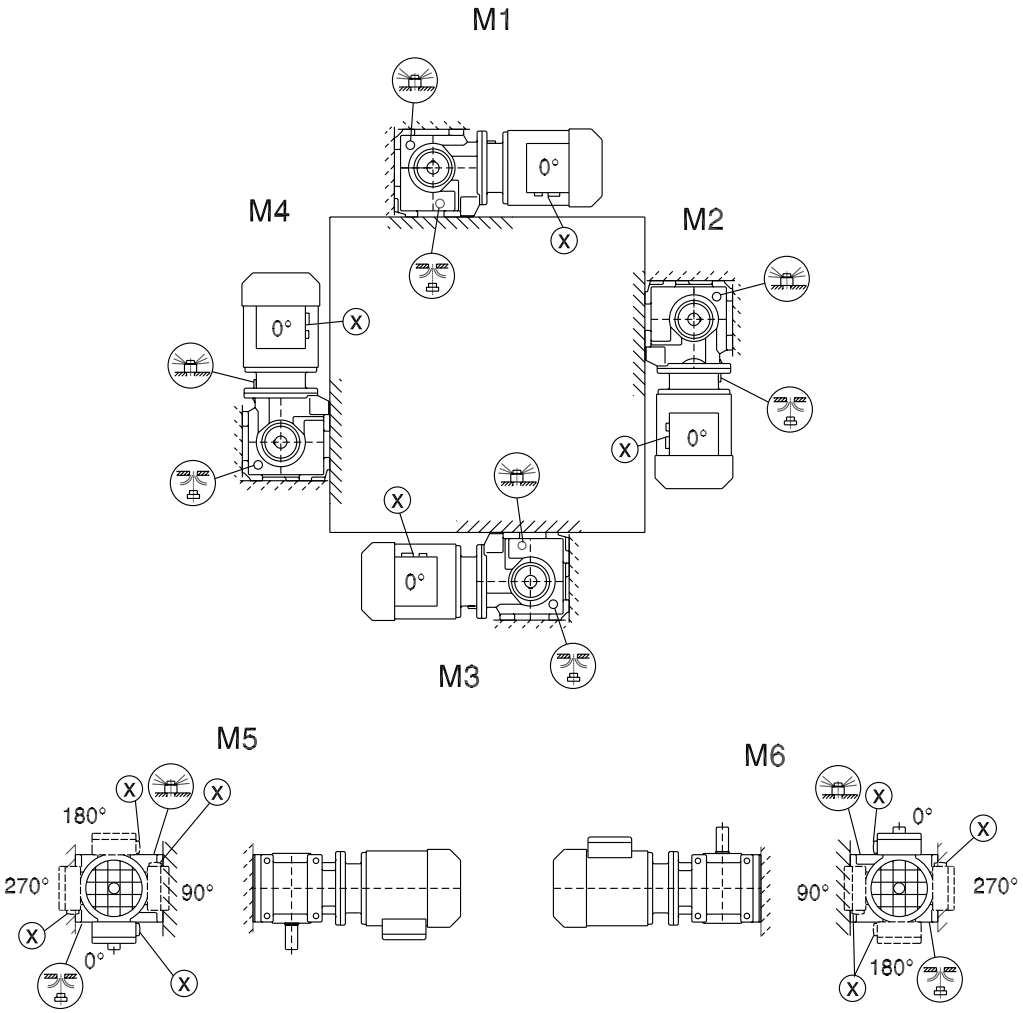




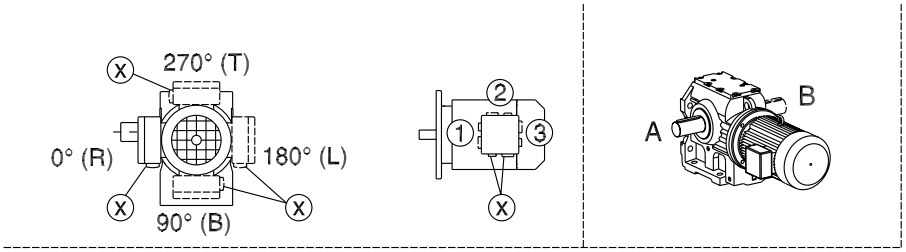
8.7 Helical-worm gearmotors S

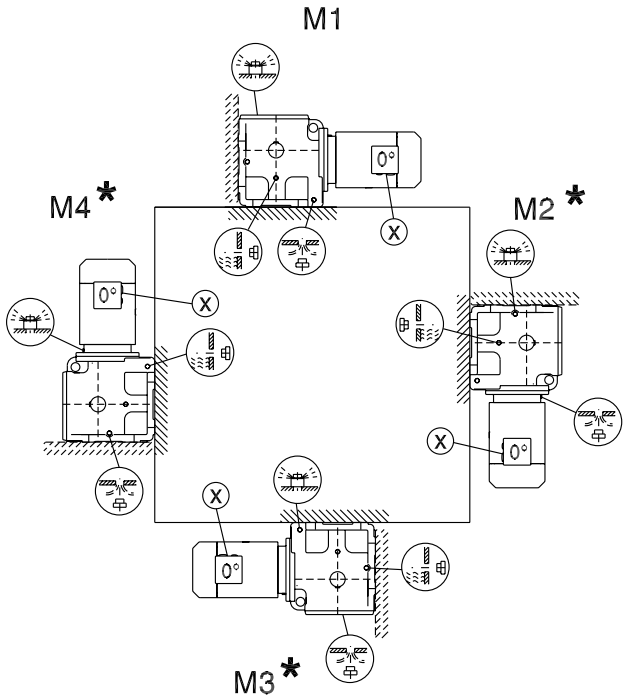
8.7.1 S37

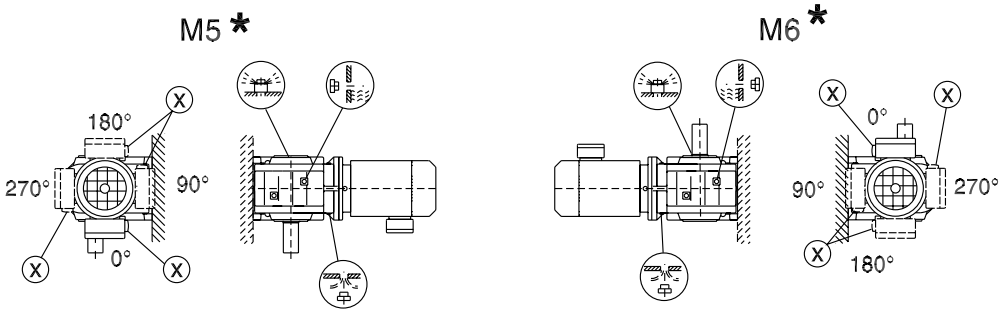




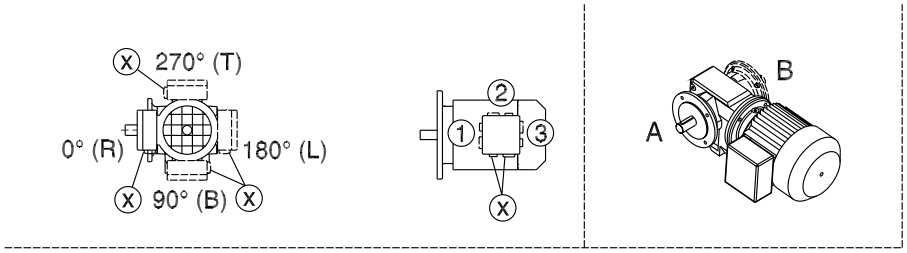
8.7.2 S47 ... S97

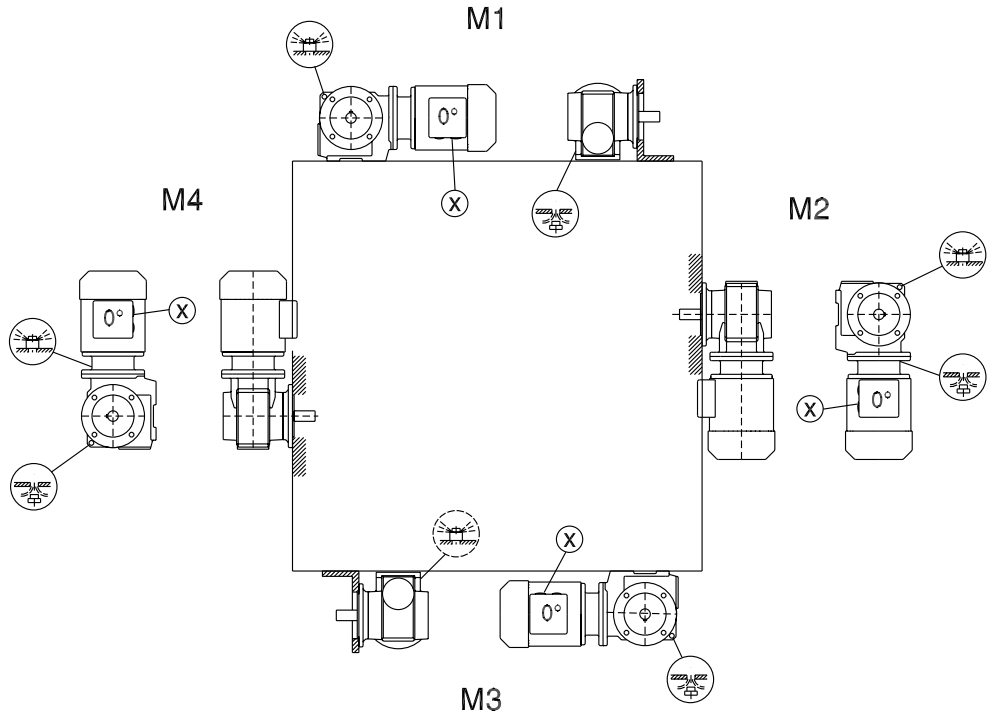




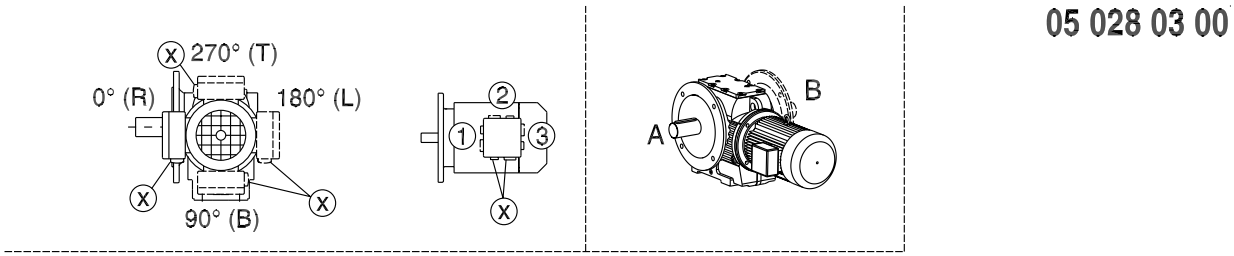


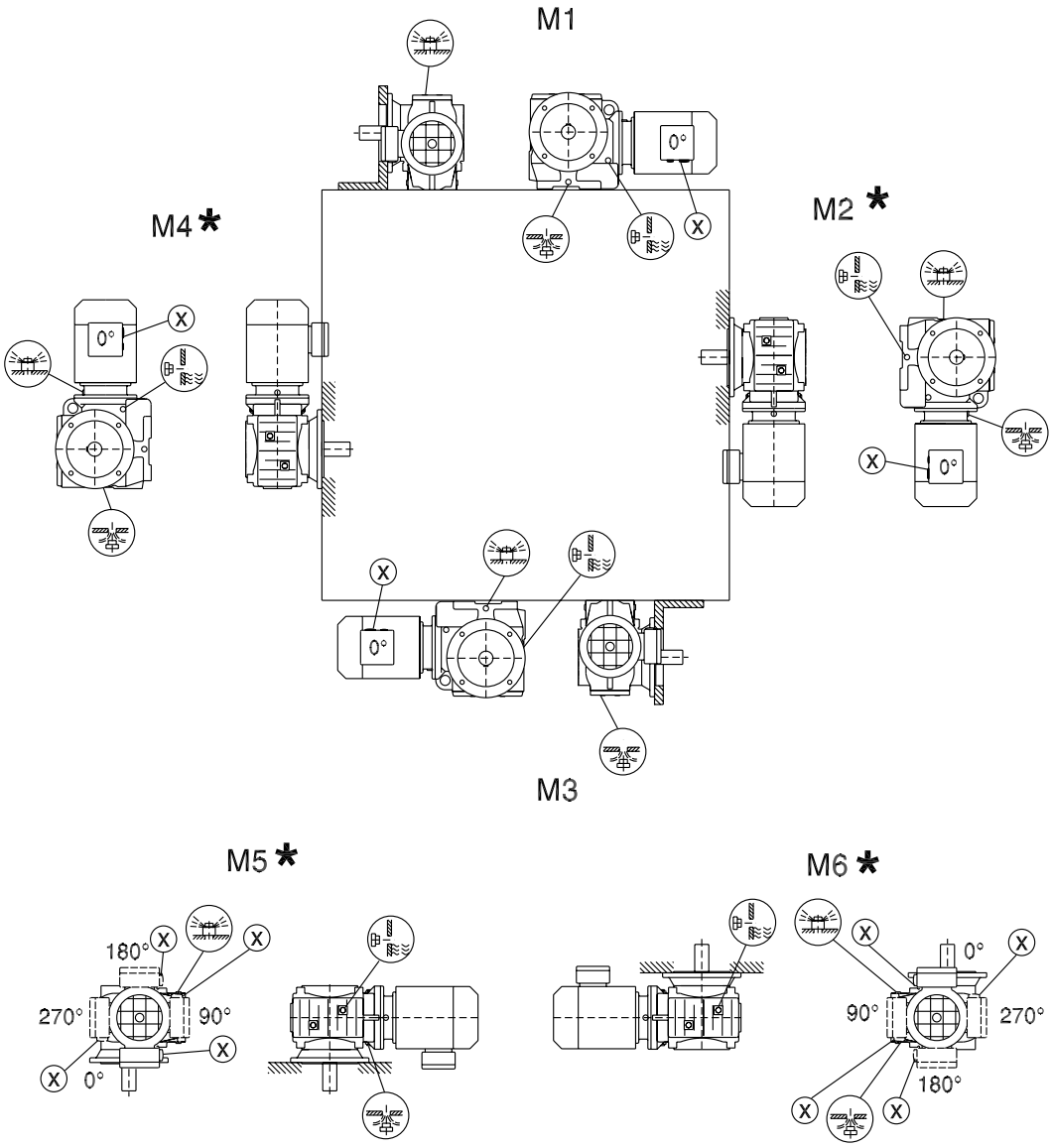
8.7.3 SF37 / SAF37 / SHF37



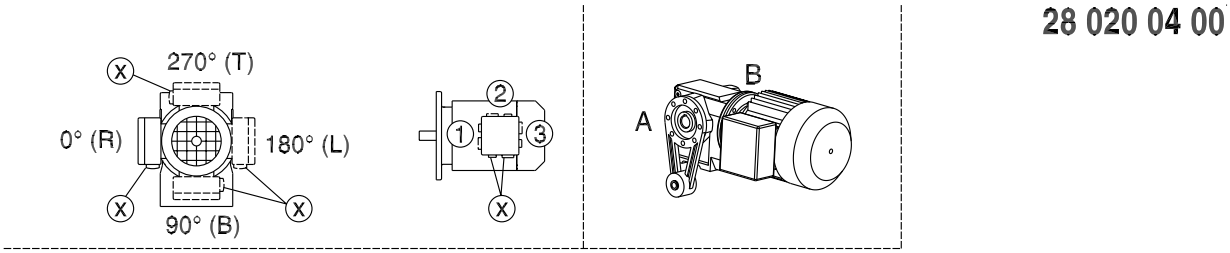


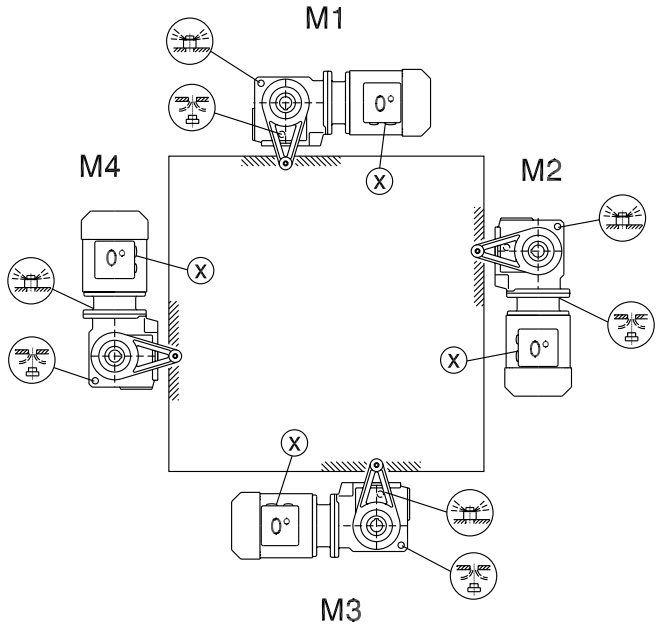
8.7.4 SF47 ... SF97 / SAF47 ... SAF97 / SHF47 ... SHF97 / SAZ47 ... SAZ97 / SHZ47 ... SHZ97

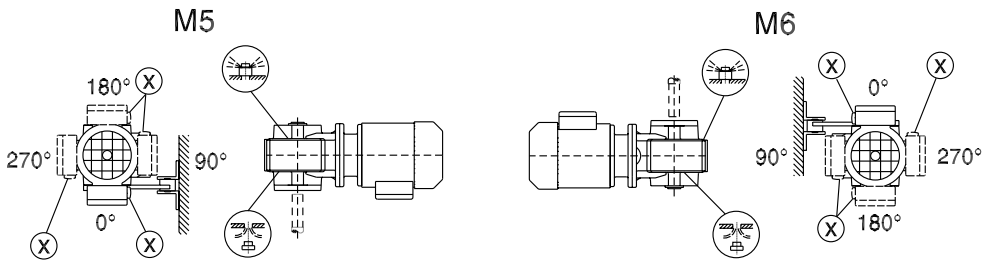




8.7.5 SA37 / SH37 / ST37







8.7.6 SA47 ... SA97 / SH47 ... SH97 / ST47 ... ST97

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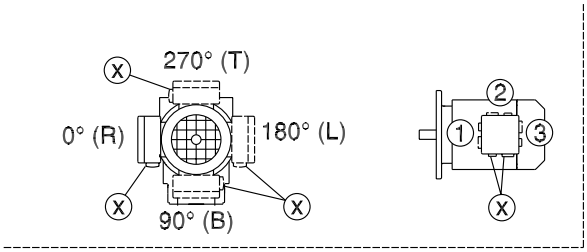

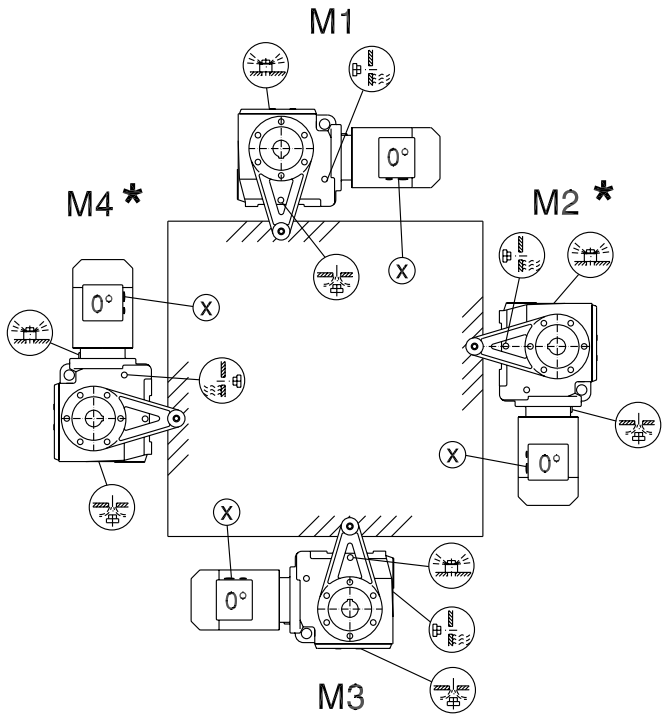

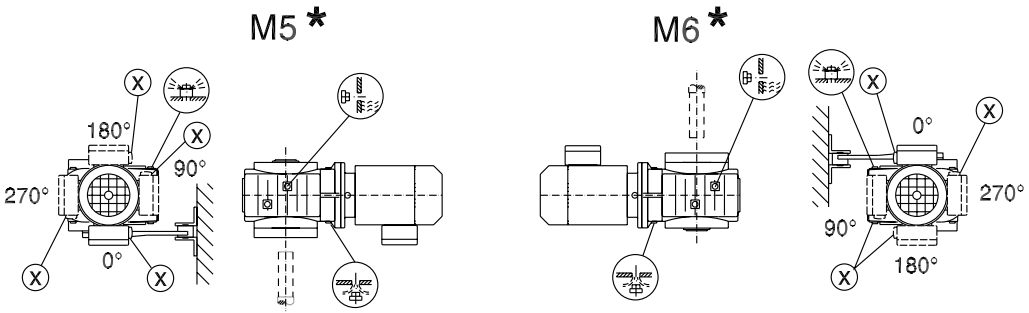

8.8 SPIROPLAN® W gearmotors

8.8.1 W10 ... W30

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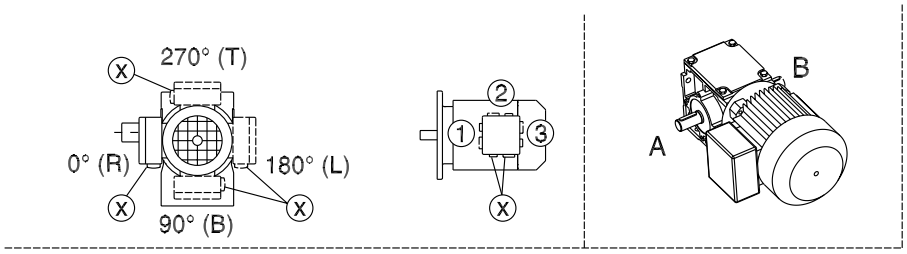
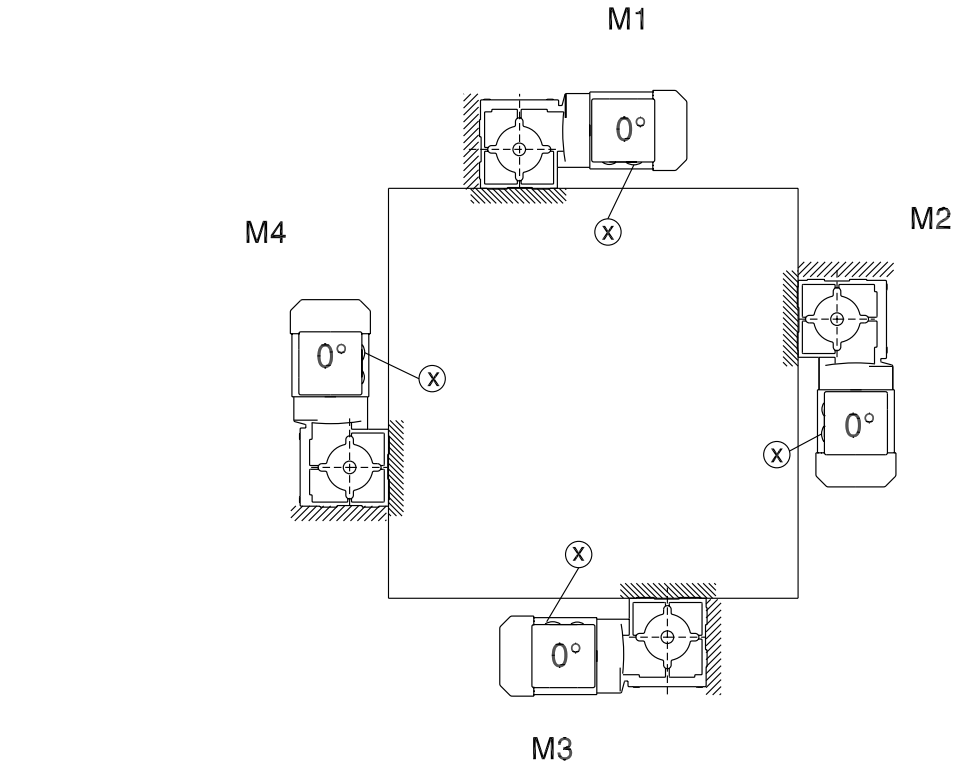
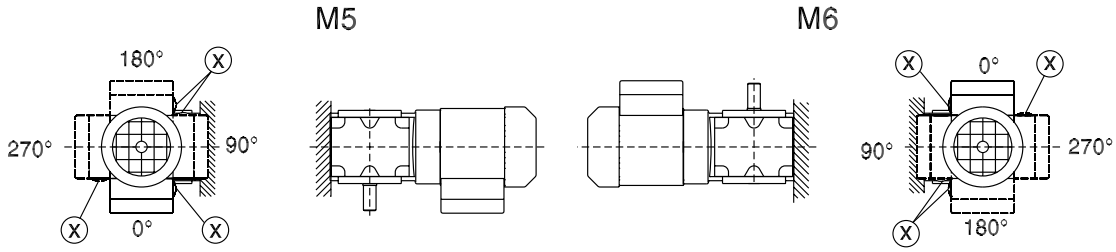
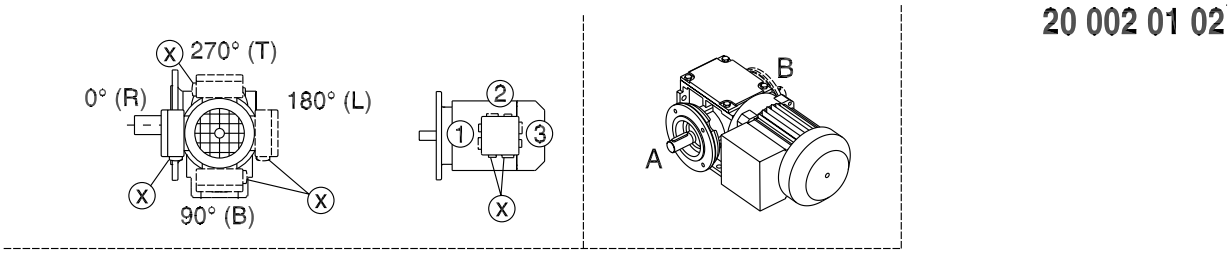
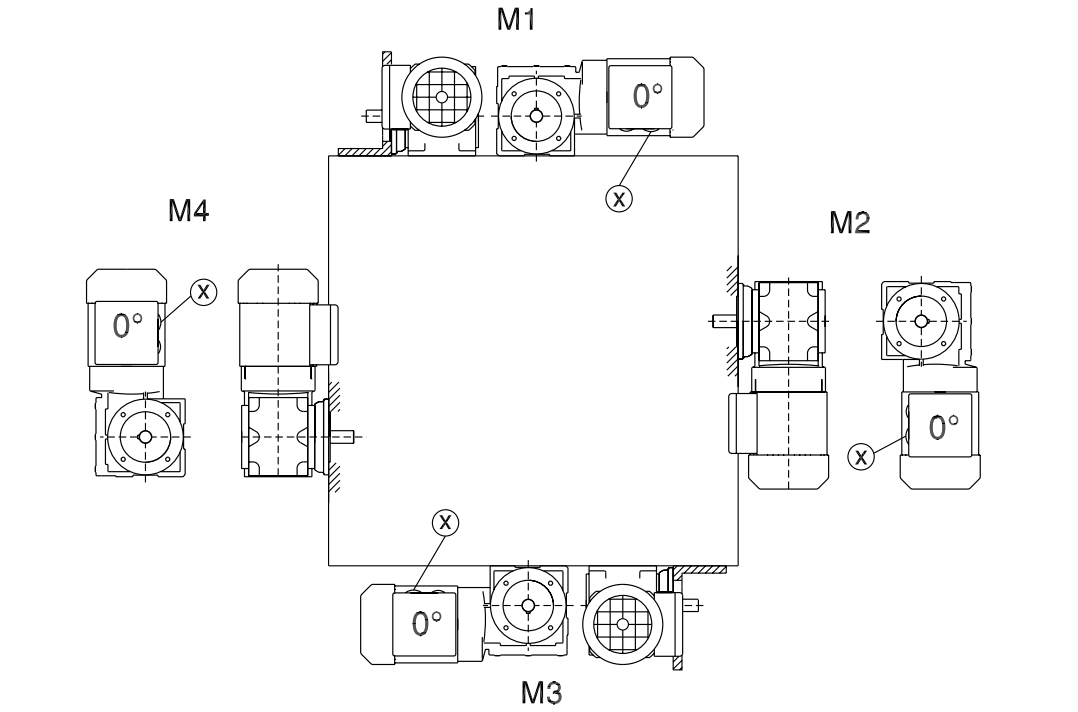


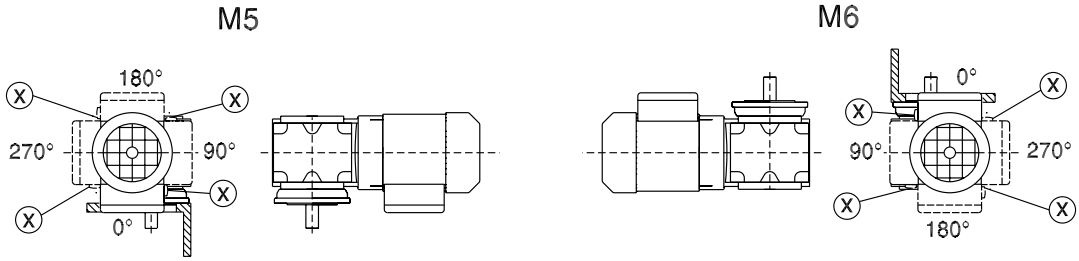




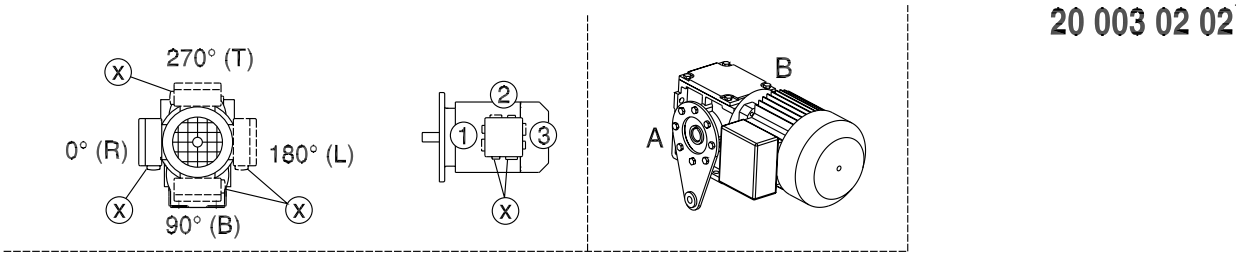
8.8.2 WF10 ... WF30 / WAF10 ... WAF30

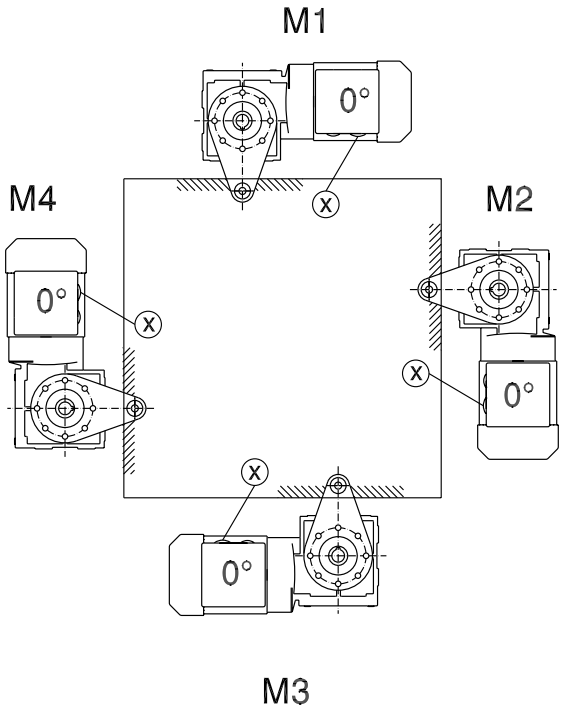


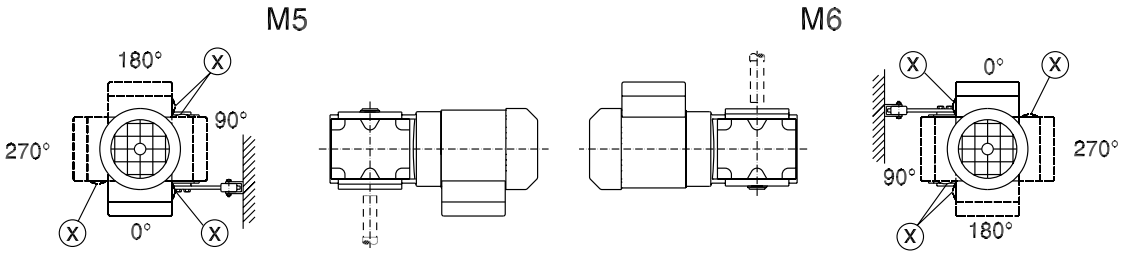




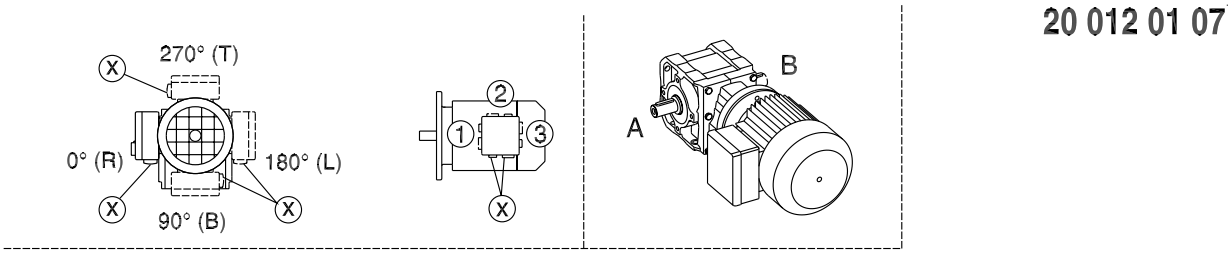
8.8.3 WA10 ... WA30

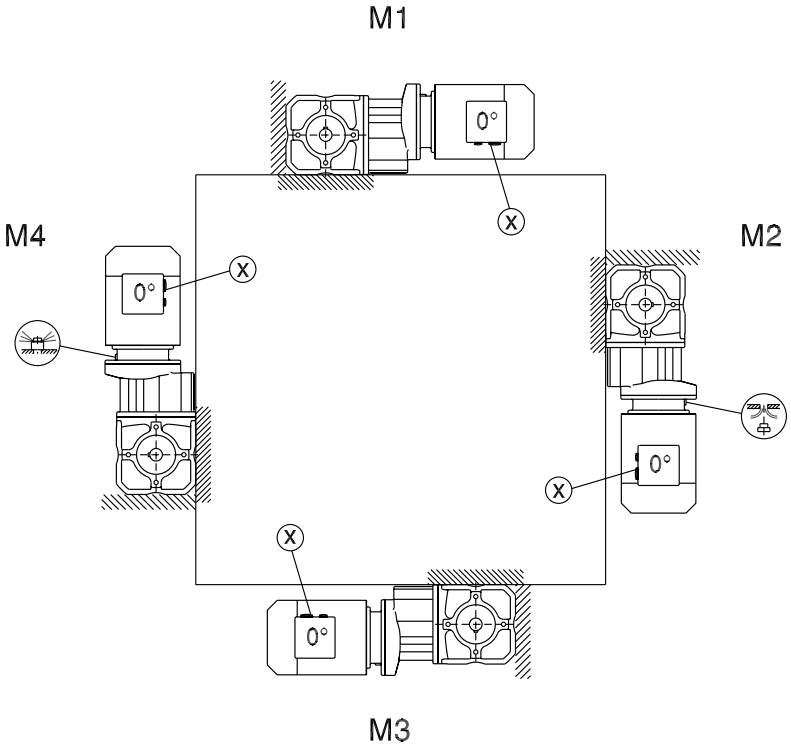


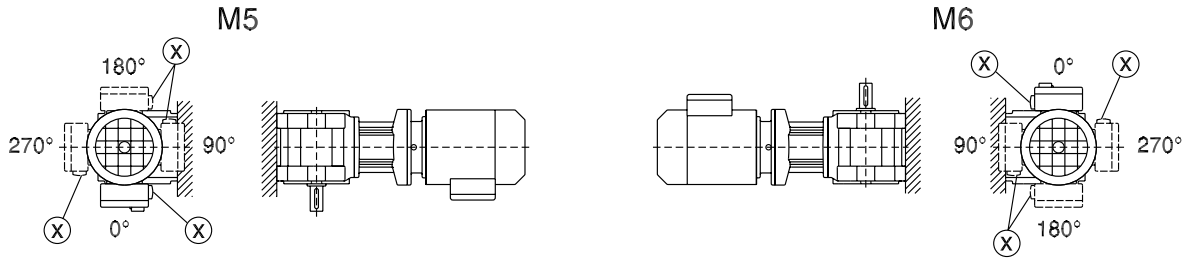




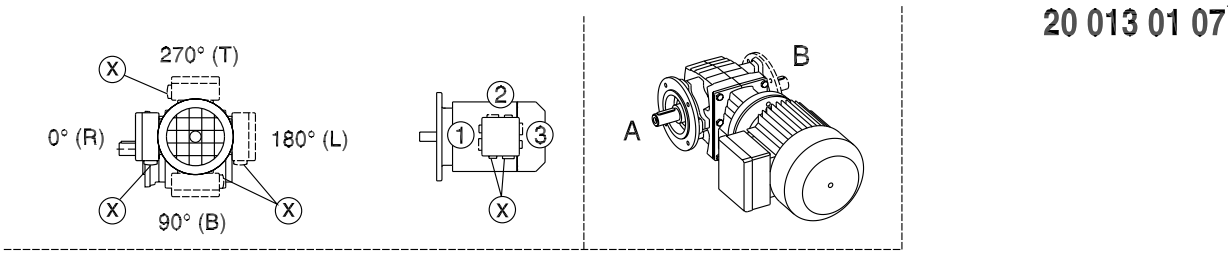
8.8.4 W37/WA37B/WH37B

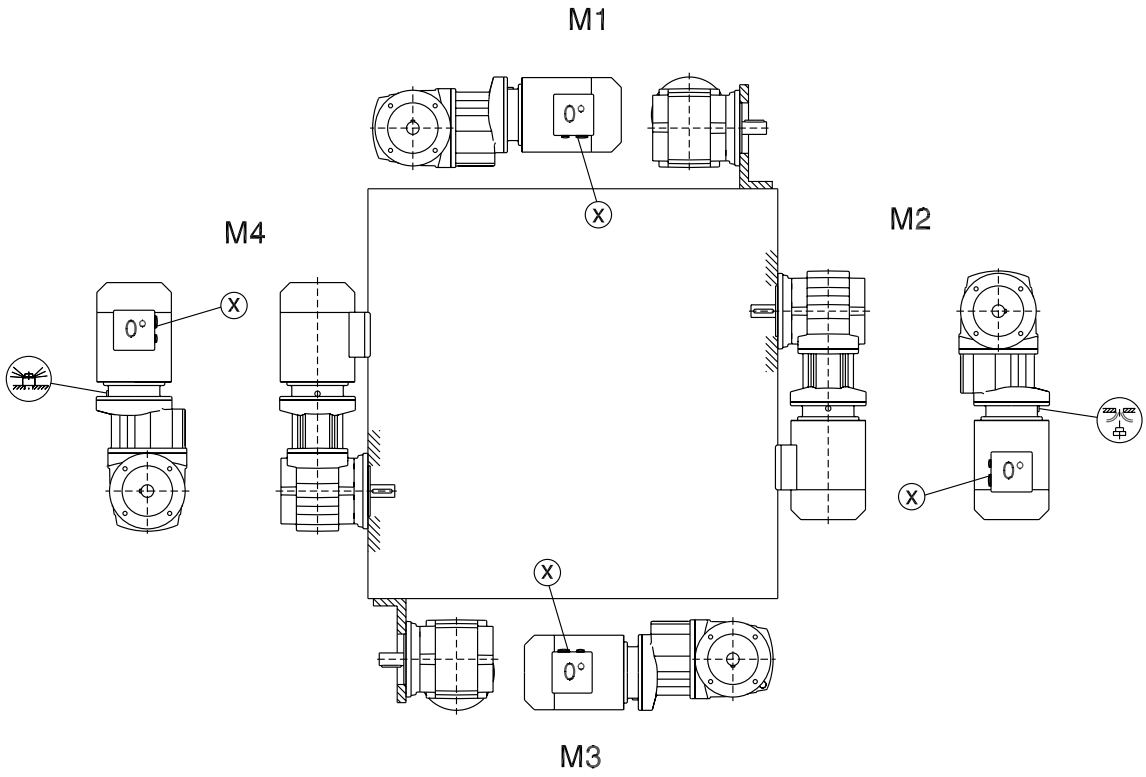


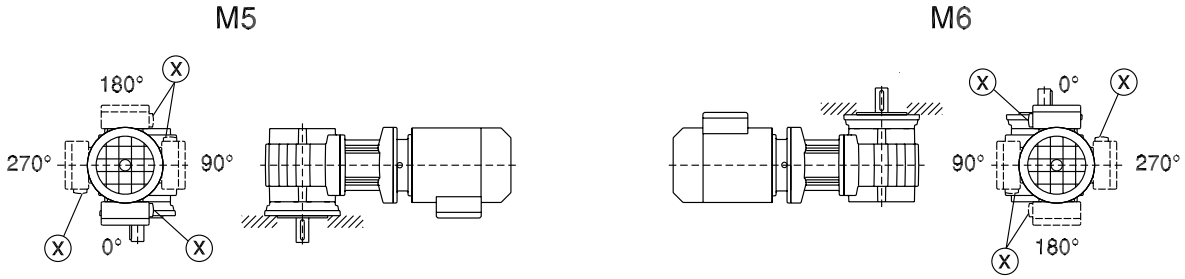




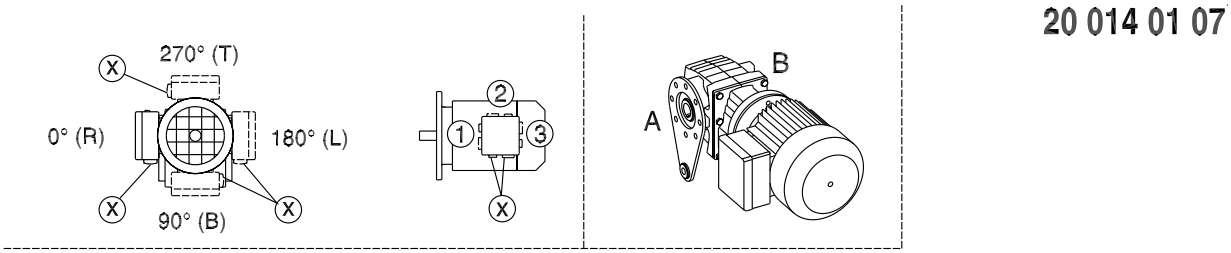
8.8.5 WF37/WAF37/WHF37

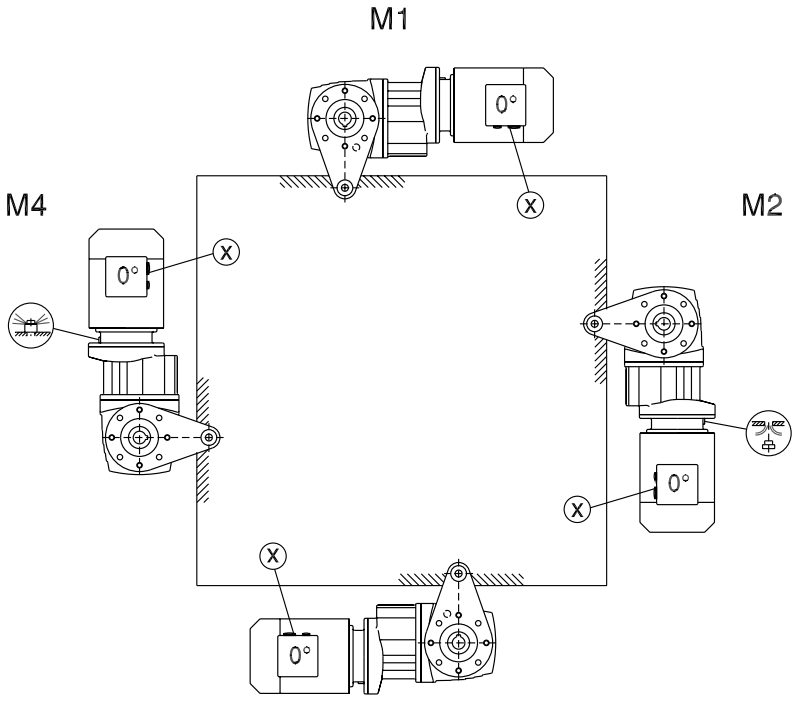


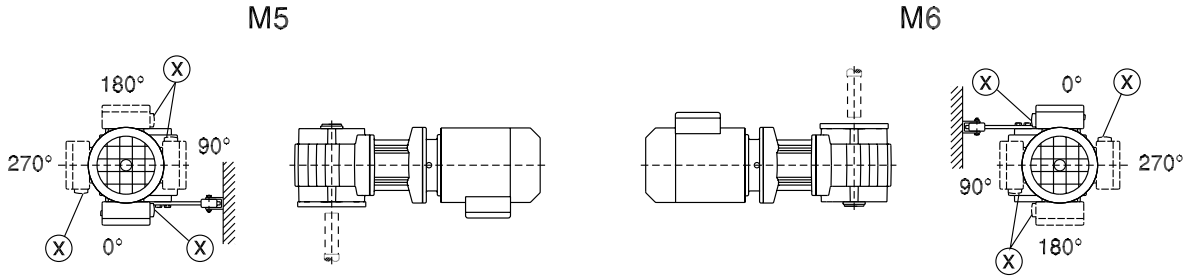




8.8.6 WA37 / WH37 / WT 37







9 Technical Data

9.1 Extended storage

	NOTE
	For storage periods longer than 9 months, SEW-EURODRIVE recommends the "Extended storage" design. Gear units in this design are designated with a corresponding label.

In this case, a VCI corrosion inhibitor (volatile corrosion inhibitor) is added to the lubricant in these gear units. Please note that this VCI corrosion inhibitor is only effective in a temperature range of -25 °C ... +50 °C. The flange contact surfaces and shaft ends are also treated with an anti-corrosion agent.

Observe the storage conditions specified in the following table for extended storage:

9.1.1 Storage conditions

The gear units must remain tightly sealed until taken into operation to prevent the VCI corrosion protection agent from evaporating.

Gear units will be supplied with an oil fill according to the mounting position (M1 ... M6) and are ready for operation. Check the oil level before you start operating the gear unit for the first time!

Climate zone	Packaging[1)]	Storage location[2)]	Storage duration
temperate (Europe, USA, Canada, China and Russia, excluding tropical zones)	Packed in containers, with desiccant and moisture indicator sealed in the plastic wrap.	With roof, protected against rain and snow, no shock loads.	Up to 3 years with regular checks of the packaging and moisture indicator (rel. humidity < 50%).
	open	Under roof, enclosed at constant temperature and atmospheric humidity (5 °C < ϑ < 60 °C, < 50% relative humidity). No sudden temperature fluctuations. Controlled ventilation with filter (free from dust and dirt). Protected against aggressive vapors and shocks.	2 years or more with regular inspections. Check for cleanliness and mechanical damage during inspection. Check corrosion protection.
Tropical (Asia, Africa, Central and South America, Australia, New Zealand excluding temperate zones)	Packed in containers, with desiccant and moisture indicator sealed in the plastic wrap. Protected against insect damage and mildew by chemical treatment.	Under roof, protected against rain and shocks.	Up to 3 years with regular checks of the packaging and moisture indicator (rel. humidity < 50%).
	open	Under roof, enclosed at constant temperature and atmospheric humidity (5 °C < ϑ < 50 °C, < 50% relative humidity). No sudden temperature fluctuations. Controlled ventilation with filter (free from dust and dirt). Protected against aggressive vapors and shocks. Protected against insect damage.	2 years or more with regular inspections. Check for cleanliness and mechanical damage during inspection. Check corrosion protection.

1) Packaging must be carried out by an experienced company using the packaging materials that have been explicitly specified for the particular application.

2) SEW-EURODRIVE recommends to store the gear units according to the mounting position.

9.2 Lubricants

Unless a special arrangement is made, SEW-EURODRIVE supplies the drives with a lubricant fill adapted for the specific gear unit and mounting position. You have to specify the mounting position (M1...M6, see section. "Mounting Positions") when you order the drive. You must adapt the lubricant fill to any subsequent changes made to the mounting position.

	NOTE ON EXPLOSION PROTECTION
	It is essential to contact SEW-EURODRIVE regarding a subsequent change of mounting position! ATEX approval will become void without prior consultation!

9.2.1 Lubricant table

The lubricant table on the following page shows the permitted lubricants for SEW-EURODRIVE explosion-proof gear units. Observe the following legend with regards to the lubricant table.

Key to the lubricant table

Abbreviations used, meaning of shading, and notes:

CLP	= Mineral oil
CLP PG	= Polyglycol (W gear units, conforms to USDA-H1)
CLP HC	= synthetic hydrocarbons
E	= Ester oil (water hazard class 1 (German regulation))
HCE	= Synthetic hydrocarbons + ester oil (USDA - H1 certification)
HLP	= Hydraulic oil
	= synthetic lubricant (= synthetic-based roller bearing grease)
	= Mineral lubricant (= mineral-based rolling bearing grease)
1)	Helical-worm gear units with PG oil: Please coordinate with SEW
2)	Special lubricant for Spiroplan® gear units only
3)	Recommendation: Select SEW $f_B \geq 1.2$
4)	Pay attention to critical starting behavior at low temperatures!
5)	Low-viscosity grease
6)	Ambient temperature
	Lubricant for the food industry (food grade oil)
	Biodegradable oil (lubricant for agriculture, forestry, and fisheries)

Anti-friction bearing greases

The anti-friction bearings in gear units and motors are given a factory-fill with the greases listed below. SEW-EURODRIVE recommends regreasing anti-friction bearings with a grease fill at the same time as changing the oil.

	Ambient temperature	Manufacturer	Type
Gear unit roller bearings	-40 °C ... +80 °C	Fuchs	Renolit CX-TOM 15
	-30 °C ... +40 °C	Aral	Eural Grease EP 2
	-20 °C ... +40 °C	Aral	Aralube BAB EP2

NOTE

The following grease quantities are required:

- For fast-running bearings (gear unit input end): Fill the cavities between the rolling elements one-third full with grease.
- For slow-running bearings (gear unit input side): Fill the cavities between the rolling elements two-thirds full with grease.

Lubricant table

017680300

	6) °C -50 0 +50 +100	DIN (ISO)	ISO,NLGI	Mobil®	Shell	Klüber	ARAL	Tribol	TEXACO	Optimol	FUCHS
R...	4) -40 Standard +80	CLP HC	VG 220	Mobil SHC630	Shell Omala 220 HD	Klübersynth GEM 4-220 N	Aral Degol PAS 220	Tribol 1510/220	Pinnacle EP 220	Optigear Synthetic A 220	Renolin Unisyn CLP 220
K...	4) -40 +40	CLP HC	VG 150	Mobil SHC629		Klübersynth GEM 4-150 N			Pinnacle EP 150		
F...	4) -40 +20	CLP HC	VG 68	Mobil SHC 626							
F...	4) -40 +10	CLP HC	VG 32	Mobil SHC 624		Klüber-Summit HySyn FG-32			Cetus PAO 46		
S..	4) -30 Standard +80	CLP HC	VG 460	Mobil SHC 634	Shell Omala 460 HD	Klübersynth GEM 4-460 N			Pinnacle EP 460		
S..	4) -40 +20	CLP HC	VG 150	Mobil SHC 629		Klübersynth GEM 4-150 N			Pinnacle EP 150		
S..	4) -40 +20	CLP HC	VG 68	Mobil SHC 626							
S..	4) -40 0	CLP HC	VG 32	Mobil SHC 624		Klüber-Summit HySyn FG-32			Cetus PAO 46		
R...,K... F...,S...	4) -30 Standard +40	HCE	VG 460		Shell Cassida Fluid GL 460	Klüberoil 4UH1-460 N	Aral Eural Gear 460			Optileb GT 460	
R...,K... F...,S...	-20 +40	E	VG 460			Klüberbio CA2-460	Aral Degol BAB 460			Optisynt BS 460	
W...	Standard -20 +40	SEW PG	VG 460 2)			Klüber SEW HT-460-5					
W...	-20 +40	CLP PG	VG 460 3)			Klübersynth UH1 6-460					

9.2.2 Lubricant fill quantities

Refer to the gear unit nameplate for prescribed lubricant fill quantities in explosion-proof gear units. Check the oil level after the filling process. See section "Inspection/maintenance for the gear unit" (see page 89).

10 Malfunctions/Service

	CAUTION! Improper handling of the gear unit and the motor may lead to damages. Potential damage to property! • Any repair work on SEW drives may be performed by qualified personnel only. • Only qualified personnel is permitted to separate drive and motor. • Consult SEW-EURODRIVE customer service.

10.1 Gear unit

Malfunction	Possible cause	Remedy
Unusual, regular running noise	Meshing/grinding noise: Bearing damage	Check the oil →see "Inspection/maintenance for the gear unit" (see page 89), change bearings.
	Knocking noise: Irregularity in the gearing	Contact customer service
Unusual, irregular running noise	Foreign bodies in the oil	• Check the oil →see "Inspection/maintenance for the gear unit" (see page 89), • Stop the drive, contact customer service
Oil leaking [1)] • From gear unit cover • at the motor flange • at the motor oil seal • at the gear unit flange • From the output end oil seal	Rubber seal on the gear cover plate leaking	Tighten the screws on the gear cover plate and observe the gear unit. If oil still leaks: Contact customer service
	Seal defective	Contact customer service
	Gear unit not ventilated	Vent the gear unit → see "Mounting Positions" (see page 106)
Oil leaking from breather valve	Too much oil	Correct the oil fill quantity →see "Inspection/maintenance for the gear unit" (see page 89),
	Drive operated in incorrect mounting position	• Properly adjust the breather valve → see "Mounting Positions" (see page 106) • Correct the oil level →see "Inspection/maintenance for the gear unit" (see page 89),
	Frequent cold starts (oil foams) and/or high oil level.	Use an oil expansion tank
Output shaft does not turn although the motor is running or the input shaft is rotated	Connection between shaft and hub in gear unit interrupted	Send in the gear unit/gearmotor for repair.

1) Short-term oil / grease leakage at the oil seal is possible in the run-in phase (48 hours running time).

10.2 AM / AQ / AL adapter

Malfunction	Possible cause	Remedy
Unusual, regular running noise	Meshing/grinding noise: Bearing damage.	Contact SEW-EURODRIVE customer service
Oil leaking	Seal defective	Contact SEW-EURODRIVE customer service
Output shaft does not turn although the motor is running or the input shaft is rotated	Connection between shaft and hub in gear unit interrupted	Send the gear unit to SEW-EURODRIVE for repair.
Change in running noise and / or vibrations.	Annular gear wear, short-term torque transfer through metal contact	Change the annular gear
	Bolts to secure hub axially are loose.	Tighten the screws
Premature wear in annular gear	• Contact with aggressive fluids / oils; ozone influence; too high ambient temperatures etc, which can cause a change in the physical properties of the annular gear. • Impermissibly high ambient/contact temperature for the annular gear; maximum permitted temperature: -20 °C to +80 °C • Overload	Contact SEW-EURODRIVE customer service

10.3 AD input shaft assembly

Malfunction	Possible cause	Remedy
Unusual, regular running noise	Meshing/grinding noise: Bearing damage.	Contact SEW-EURODRIVE customer service
Oil leaking	Seal defective	Contact SEW-EURODRIVE customer service
Output shaft does not turn although the input shaft is rotated.	Connection between shaft and hub in gear unit or cover interrupted	Send the gear unit to SEW-EURODRIVE for repair.

10.4 Adapter with a torque limiting coupling AR

Malfunction	Possible causes	Solution
Unusual, regular running noise	Meshing/grinding noise: Bearing damage.	Contact SEW-EURODRIVE customer service
Oil leaking	Seal defective	Contact SEW-EURODRIVE customer service
Evaluation unit display empty	• Encoder on adapter is defective • Friction lining worn.	Measure input pulses, if necessary: • Change encoder of the adapter, see section Inspection/Maintenance "Changing the pulse encoder of the adapter".
Slip torque is not reached.	• Friction lining worn. • Cup springs burned out or installed incorrectly after maintenance.	Inspect friction lining/cup springs, see section Inspection/Maintenance Inspecting/replacing friction lining, adjusting the slip torque".

10.5 Customer service

Please have the following information available if you require customer service assistance:

- Nameplate data (complete)
- Type and extent of the problem
- Time the problem occurred and any accompanying circumstances
- Assumed cause

10.6 Disposal

Dispose gear units in accordance with the regulations in force regarding respective materials:

- Steel scrap
  - Housing parts
  - Gears
  - Shafts
  - Roller bearing
- Parts of the worm gears are made of non-ferrous metals. Dispose of the worm gears as appropriate.
- Collect waste oil and dispose of it according to the regulations in force.

11 Declarations of Conformity

11.1 Gearmotors in categories II2G and II2D

EG-Konformitätserklärung

EC-Declaration of Conformity
Déclaration de conformité CE

im Sinne der Richtlinie 94/9/EG, Anhang VIII **Nr**./*No*/*N*° **130.04**
according to EC Directive 94/9/EC, Appendix VIII
au sens de la directive CE 94/9/CE, Annexe VIII

SEW EURODRIVE GmbH & Co KG
Ernst-Blickle-Straße 42, D-76646 Bruchsal

erklärt in alleiniger Verantwortung die Konformität der folgenden Produkte:
declares under sole responsibility conformity of the following products:
déclare, sous sa seule responsabilité, que les produits :

R-, K-, F- S - und W- Getriebemotoren	**der Kategorien**	**2GD**
R-, K-, F- S - and W- geared motors	*in categorys*	*2GD*
Motoréducteurs R, K, F, S et W	*des catégories*	*2GD*

mit der Richtlinie:	***94/9 EG***
with the directive:	*94/9 EC*
respectent la directive :	*94/9 CE*

angewandte Normen:	**EN 1127-1: 1997-10**
applied standards:	**EN 13463-1: 2001-11**
Normes appliquées :	**EN 13463-5: 2003-12**
	EN 13463-8: 2003-09
	EN 60529 :2000-09

SEW-EURODRIVE hinterlegt die gemäß 94/9EG, Anhang VIII geforderten Unterlagen bei benannter Stelle: FSA GmbH, EU - Kennnummer 0558

SEW-EURODRIVE will archive the documents required according to 94/9/EC, Appendix VIII at the following location: FSA GmbH, EU Code 0558

SEW-EURODRIVE tient à disposition la documentation spécifiée dans la directive 94/9/CEE, Annexe VIII pour consultation à l'endroit désigné : FSA GmbH, code UE 0558

Ort / Datum
Place/date / Lieu et date

Bruchsal, 03.09.2004

Geschäftsführer Vertrieb und Marketing
Managing Director Sales and Marketing
Directeur général international commercial et marketing

H. Sondermann

11.2 Gear units in category II2G and II2D with AM / AQA / AL / AD adapter

EG-Konformitätserklärung

EC-Declaration of Conformity
Déclaration de conformité CE

DIN EN ISO 9001

im Sinne der Richtlinie 94/9/EG, Anhang VIII **Nr**./*No*/*N°* **111.05**
according to EC Directive 94/9/EC, Appendix VIII
au sens de la directive CE 94/9/CE, Annexe VIII

SEW EURODRIVE GmbH & Co KG
Ernst-Blickle-Straße 42, D-76646 Bruchsal

erklärt in alleiniger Verantwortung die Konformität der folgenden Produkte:
declares under sole responsibility conformity of the following products:
déclare, sous sa seule responsabilité, que les produits :

R-, K-, F- und S-Getriebe mit den Anbaukomponenten AM, AQA, AL und AD der Kategorien 2GD
R-, K-, F- and S-gear with the input components AM, AQA, AL and AD in categorys 2GD
Réducteurs R, K, F et S avec les composants d´entrée AM, AQA, AL et AD des catégories 2GD

mit der Richtlinie:	***94/9 EG***
with the directive:	*94/9 EC*
respectent la directive :	*94/9 CE*

angewandte Normen:	**EN 1127-1: 1997-10**
applied standards:	**EN 13463-1: 2001-11**
Normes appliquées :	**EN 13463-5: 2003-12**
	EN 13463-8: 2003-09
	EN 60529 :2000-09

SEW-EURODRIVE hinterlegt die gemäß 94/9EG, Anhang VIII geforderten Unterlagen bei benannter Stelle: FSA GmbH, EU - Kennnummer 0558

SEW-EURODRIVE will archive the documents required according to 94/9/EC, Appendix VIII at the following location: FSA GmbH, EU Code 0558

SEW-EURODRIVE tient à disposition la documentation spécifiée dans la directive 94/9/CEE, Annexe VIII pour consultation à l'endroit désigné : FSA GmbH, code UE 0558

Ort / Datum
Place/date / Lieu et date

Bruchsal, 05.11.2003

Geschäftsführer Vertrieb und Marketing
Managing Director Sales and Marketing
Directeur général international commercial et marketing

H. Sondermann

11.3 Gear units in category II3G and II3D with AR adapter

EG-Konformitätserklärung

EC-Declaration of Conformity
Déclaration de conformité EC

im Sinne der Richtlinie 94/9/EG, Anhang VIII **Nr.**/*No*/*N°* **106.05**
according to EC Directive 94/9/EC, Appendix VIII
au sens de la directive CE 94/9/CE, Annexe VIII

SEW EURODRIVE GmbH & Co KG
Ernst-Blickle-Straße 42, D-76646 Bruchsal

erklärt in alleiniger Verantwortung die Konformität der folgenden Produkte:
declares under sole responsibility conformity of the following products:
déclare, sous sa seule responsabilité, que les produits :

R-, K-, F- und S-Getriebe mit der Anbaukomponente AR der Kategorien 3GD
R-, K-, F- and S-gear with the input components AR in categorys 3GD
Réducteurs R, K, F et S avec les composants d´ entrée AR de catégories 3GD

mit der Richtlinie:	***94/9 EG***
with the directive:	*94/9 EC*
respectent la directive :	*94/9 CE*

angewandte Normen:	**EN 1127-1: 1997-03**
applied standards:	**EN 13463-1: 2001-11**
Normes appliquées :	**EN 13463-5: 2003-12**
	EN 13463-8: 2003-09
	EN 60529: 2000-09

SEW-EURODRIVE hält folgende technische Dokumentationen zur Einsicht bereit:
SEW-EURODRIVE has the following documentation available for review:
SEW-EURODRIVE tient à disposition la documentation technique suivante pour consultation :

- Vorschriftsmäßige Bedienungsanleitung
- *Installation and operating Instructions in conformance with applicable regulations*
- *Notice d'utilisation conforme aux prescriptions*

- Technische Bauunterlagen
- *Technical design documentation*
- *Dossier technique de construction*

Ort / Datum
Place/date / Lieu et date

Bruchsal, 04.11.2003

Geschäftsführer Vertrieb und Marketing
Managing Director Sales and Marketing
Directeur général international commercial et marketing

H. Sondermann

12 Address List

Germany			
Headquarters **Production** **Sales**	**Bruchsal**	SEW-EURODRIVE GmbH & Co KG Ernst-Blickle-Straße 42 D-76646 Bruchsal P.O. Box Postfach 3023 • D-76642 Bruchsal	Tel. +49 7251 75-0 Fax +49 7251 75-1970 http://www.sew-eurodrive.de sew@sew-eurodrive.de
Service Competence Center	**Central**	SEW-EURODRIVE GmbH & Co KG Ernst-Blickle-Straße 1 D-76676 Graben-Neudorf	Tel. +49 7251 75-1710 Fax +49 7251 75-1711 sc-mitte@sew-eurodrive.de
	North	SEW-EURODRIVE GmbH & Co KG Alte Ricklinger Straße 40-42 D-30823 Garbsen (near Hannover)	Tel. +49 5137 8798-30 Fax +49 5137 8798-55 sc-nord@sew-eurodrive.de
	East	SEW-EURODRIVE GmbH & Co KG Dänkritzer Weg 1 D-08393 Meerane (near Zwickau)	Tel. +49 3764 7606-0 Fax +49 3764 7606-30 sc-ost@sew-eurodrive.de
	South	SEW-EURODRIVE GmbH & Co KG Domagkstraße 5 D-85551 Kirchheim (near München)	Tel. +49 89 909552-10 Fax +49 89 909552-50 sc-sued@sew-eurodrive.de
	West	SEW-EURODRIVE GmbH & Co KG Siemensstraße 1 D-40764 Langenfeld (near Düsseldorf)	Tel. +49 2173 8507-30 Fax +49 2173 8507-55 sc-west@sew-eurodrive.de
	Electronics	SEW-EURODRIVE GmbH & Co KG Ernst-Blickle-Straße 42 D-76646 Bruchsal	Tel. +49 7251 75-1780 Fax +49 7251 75-1769 sc-elektronik@sew-eurodrive.de
	Drive Service Hotline / 24 Hour Service		+49 180 5 SEWHELP +49 180 5 7394357
	Additional addresses for service in Germany provided on request!		

France			
Production **Sales** **Service**	**Haguenau**	SEW-USOCOME 48-54, route de Soufflenheim B. P. 20185 F-67506 Haguenau Cedex	Tel. +33 3 88 73 67 00 Fax +33 3 88 73 66 00 http://www.usocome.com sew@usocome.com
Production	**Forbach**	SEW-EUROCOME Zone Industrielle Technopôle Forbach Sud B. P. 30269 F-57604 Forbach Cedex	Tel. +33 3 87 29 38 00
Assembly **Sales** **Service**	**Bordeaux**	SEW-USOCOME Parc d'activités de Magellan 62, avenue de Magellan - B. P. 182 F-33607 Pessac Cedex	Tel. +33 5 57 26 39 00 Fax +33 5 57 26 39 09
	Lyon	SEW-USOCOME Parc d'Affaires Roosevelt Rue Jacques Tati F-69120 Vaulx en Velin	Tel. +33 4 72 15 37 00 Fax +33 4 72 15 37 15
	Paris	SEW-USOCOME Zone industrielle 2, rue Denis Papin F-77390 Verneuil l'Etang	Tel. +33 1 64 42 40 80 Fax +33 1 64 42 40 88
	Additional addresses for service in France provided on request!		

Algeria			
Sales	**Alger**	Réducom 16, rue des Frères Zaghnoun Bellevue El-Harrach 16200 Alger	Tel. +213 21 8222-84 Fax +213 21 8222-84 reducom_sew@yahoo.fr

Argentina			
Assembly **Sales** **Service**	**Buenos Aires**	SEW EURODRIVE ARGENTINA S.A. Centro Industrial Garin, Lote 35 Ruta Panamericana Km 37,5 1619 Garin	Tel. +54 3327 4572-84 Fax +54 3327 4572-21 sewar@sew-eurodrive.com.ar http://www.sew-eurodrive.com.ar

Australia			
Assembly **Sales** **Service**	**Melbourne**	SEW-EURODRIVE PTY. LTD. 27 Beverage Drive Tullamarine, Victoria 3043	Tel. +61 3 9933-1000 Fax +61 3 9933-1003 http://www.sew-eurodrive.com.au enquires@sew-eurodrive.com.au
	Sydney	SEW-EURODRIVE PTY. LTD. 9, Sleigh Place, Wetherill Park New South Wales, 2164	Tel. +61 2 9725-9900 Fax +61 2 9725-9905 enquires@sew-eurodrive.com.au

Austria			
Assembly **Sales** **Service**	**Wien**	SEW-EURODRIVE Ges.m.b.H. Richard-Strauss-Strasse 24 A-1230 Wien	Tel. +43 1 617 55 00-0 Fax +43 1 617 55 00-30 http://sew-eurodrive.at sew@sew-eurodrive.at

Belarus			
Sales	**Minsk**	SEW-EURODRIVE BY RybalkoStr. 26 BY-220033 Minsk	Tel.+375 (17) 298 38 50 Fax +375 (17) 29838 50 sales@sew.by

Belgium			
Assembly **Sales** **Service**	**Brüssel**	SEW Caron-Vector S.A. Avenue Eiffel 5 B-1300 Wavre	Tel. +32 10 231-311 Fax +32 10 231-336 http://www.sew-eurodrive.be info@caron-vector.be
Service Competence Center	**Industrial Gears**	SEW Caron-Vector S.A. Rue de Parc Industriel, 31 BE-6900 Marche-en-Famenne	Tel. +32 84 219-878 Fax +32 84 219-879 http://www.sew-eurodrive.be service-wallonie@sew-eurodrive.be

Brazil			
Production **Sales** **Service**	**Sao Paulo**	SEW-EURODRIVE Brasil Ltda. Avenida Amâncio Gaiolli, 152 - Rodovia Presidente Dutra Km 208 Guarulhos - 07251-250 - SP SAT - SEW ATENDE - 0800 7700496	Tel. +55 11 6489-9133 Fax +55 11 6480-3328 http://www.sew-eurodrive.com.br sew@sew.com.br
	Additional addresses for service in Brazil provided on request!		

Bulgaria			
Sales	**Sofia**	BEVER-DRIVE GmbH Bogdanovetz Str.1 BG-1606 Sofia	Tel. +359 2 9151160 Fax +359 2 9151166 bever@fastbg.net

Cameroon			
Sales	**Douala**	Electro-Services Rue Drouot Akwa B.P. 2024 Douala	Tel. +237 33 431137 Fax +237 33 431137

Canada			
Assembly **Sales** **Service**	**Toronto**	SEW-EURODRIVE CO. OF CANADA LTD. 210 Walker Drive Bramalea, Ontario L6T3W1	Tel. +1 905 791-1553 Fax +1 905 791-2999 http://www.sew-eurodrive.ca marketing@sew-eurodrive.ca
	Vancouver	SEW-EURODRIVE CO. OF CANADA LTD. 7188 Honeyman Street Delta. B.C. V4G 1 E2	Tel. +1 604 946-5535 Fax +1 604 946-2513 marketing@sew-eurodrive.ca
	Montreal	SEW-EURODRIVE CO. OF CANADA LTD. 2555 Rue Leger LaSalle, Quebec H8N 2V9	Tel. +1 514 367-1124 Fax +1 514 367-3677 marketing@sew-eurodrive.ca
	Additional addresses for service in Canada provided on request!		

Chile			
Assembly **Sales** **Service**	**Santiago de Chile**	SEW-EURODRIVE CHILE LTDA. Las Encinas 1295 Parque Industrial Valle Grande LAMPA RCH-Santiago de Chile P.O. Box Casilla 23 Correo Quilicura - Santiago - Chile	Tel. +56 2 75770-00 Fax +56 2 75770-01 http://www.sew-eurodrive.cl ventas@sew-eurodrive.cl

China			
Production **Assembly** **Sales** **Service**	**Tianjin**	SEW-EURODRIVE (Tianjin) Co., Ltd. No. 46, 7th Avenue, TEDA Tianjin 300457	Tel. +86 22 25322612 Fax +86 22 25322611 info@sew-eurodrive.cn http://www.sew-eurodrive.cn
Assembly **Sales** **Service**	**Suzhou**	SEW-EURODRIVE (Suzhou) Co., Ltd. 333, Suhong Middle Road Suzhou Industrial Park Jiangsu Province, 215021	Tel. +86 512 62581781 Fax +86 512 62581783 suzhou@sew-eurodrive.cn
	Guangzhou	SEW-EURODRIVE (Guangzhou) Co., Ltd. No. 9, JunDa Road East Section of GETDD Guangzhou 510530	Tel. +86 20 82267890 Fax +86 20 82267891 guangzhou@sew-eurodrive.cn
	Shenyang	SEW-EURODRIVE (Shenyang) Co., Ltd. 10A-2, 6th Road Shenyang Economic Technological Development Area Shenyang, 110141	Tel. +86 24 25382538 Fax +86 24 25382580 shenyang@sew-eurodrive.cn
	Wuhan	SEW-EURODRIVE (Wuhan) Co., Ltd. 10A-2, 6th Road No. 59, the 4th Quanli Road, WEDA 430056 Wuhan	Tel. +86 27 84478398 Fax +86 27 84478388
	Additional addresses for service in China provided on request!		

Colombia			
Assembly **Sales** **Service**	**Bogotá**	SEW-EURODRIVE COLOMBIA LTDA. Calle 22 No. 132-60 Bodega 6, Manzana B Santafé de Bogotá	Tel. +57 1 54750-50 Fax +57 1 54750-44 http://www.sew-eurodrive.com.co sewcol@sew-eurodrive.com.co

Croatia			
Sales **Service**	**Zagreb**	KOMPEKS d. o. o. PIT Erdödy 4 II HR 10 000 Zagreb	Tel. +385 1 4613-158 Fax +385 1 4613-158 kompeks@inet.hr

Czech Republic			
Sales	**Praha**	SEW-EURODRIVE CZ S.R.O. Business Centrum Praha Lužná 591 CZ-16000 Praha 6 - Vokovice	Tel. +420 255 709 601 Fax +420 220 121 237 http://www.sew-eurodrive.cz sew@sew-eurodrive.cz

Denmark			
Assembly **Sales** **Service**	**Kopenhagen**	SEW-EURODRIVEA/S Geminivej 28-30 DK-2670 Greve	Tel. +45 43 9585-00 Fax +45 43 9585-09 http://www.sew-eurodrive.dk sew@sew-eurodrive.dk

Egypt			
Sales **Service**	**Cairo**	Copam Egypt for Engineering & Agencies 33 El Hegaz ST, Heliopolis, Cairo	Tel. +20 2 22566-299 + 1 23143088 Fax +20 2 22594-757 http://www.copam-egypt.com/ copam@datum.com.eg

Estonia			
Sales	**Tallin**	ALAS-KUUL AS Reti tee 4 EE-75301 Peetri küla, Rae vald, Harjumaa	Tel. +372 6593230 Fax +372 6593231 veiko.soots@alas-kuul.ee

Finland			
Assembly **Sales** **Service**	**Lahti**	SEW-EURODRIVE OY Vesimäentie 4 FIN-15860 Hollola 2	Tel. +358 201 589-300 Fax +358 3 780-6211 sew@sew.fi http://www.sew-eurodrive.fi
Production **Assembly** **Service**	**Karkkila**	SEW Industrial Gears OY Valurinkatu 6 FIN-03600 Karkkila	Tel. +358 201 589-300 Fax +358 201 589-310 sew@sew.fi http://www.sew-eurodrive.fi

Gabon			
Sales	**Libreville**	Electro-Services B.P. 1889 Libreville	Tel. +241 7340-11 Fax +241 7340-12

Great Britain			
Assembly **Sales** **Service**	**Normanton**	SEW-EURODRIVE Ltd. Beckbridge Industrial Estate P.O. Box No.1 GB-Normanton, West- Yorkshire WF6 1QR	Tel. +44 1924 893-855 Fax +44 1924 893-702 http://www.sew-eurodrive.co.uk info@sew-eurodrive.co.uk

Greece			
Sales **Service**	**Athen**	Christ. Boznos & Son S.A. 12, Mavromichali Street P.O. Box 80136, GR-18545 Piraeus	Tel. +30 2 1042 251-34 Fax +30 2 1042 251-59 http://www.boznos.gr info@boznos.gr

Hong Kong			
Assembly **Sales** **Service**	**Hong Kong**	SEW-EURODRIVE LTD. Unit No. 801-806, 8th Floor Hong Leong Industrial Complex No. 4, Wang Kwong Road Kowloon, Hong Kong	Tel. +852 2 7960477 + 79604654 Fax +852 2 7959129 contact@sew-eurodrive.hk

Hungary			
Sales **Service**	**Budapest**	SEW-EURODRIVE Kft. H-1037 Budapest Kunigunda u. 18	Tel. +36 1 437 06-58 Fax +36 1 437 06-50 office@sew-eurodrive.hu

India			
Assembly **Sales** **Service**	**Vadodara**	SEW-EURODRIVE India Private Limited Plot No. 4, GIDC POR Ramangamdi • Vadodara - 391 243 Gujarat	Tel. +91 265 2831086 Fax +91 265 2831087 http://www.seweurodriveindia.com sales@seweurodriveindia.com subodh.ladwa@seweurodriveindia.com

Ireland			
Sales **Service**	**Dublin**	Alperton Engineering Ltd. 48 Moyle Road Dublin Industrial Estate Glasnevin, Dublin 11	Tel. +353 1 830-6277 Fax +353 1 830-6458 info@alperton.ie http://www.alperton.ie

Israel			
Sales	**Tel-Aviv**	Liraz Handasa Ltd. Ahofer Str 34B / 228 58858 Holon	Tel. +972 3 5599511 Fax +972 3 5599512 http://www.liraz-handasa.co.il office@liraz-handasa.co.il

Italy			
Assembly **Sales** **Service**	**Milano**	SEW-EURODRIVE di R. Blickle & Co.s.a.s. Via Bernini,14 I-20020 Solaro (Milano)	Tel. +39 02 96 9801 Fax +39 02 96 799781 http://www.sew-eurodrive.it sewit@sew-eurodrive.it

Ivory Coast			
Sales	**Abidjan**	SICA Ste industrielle et commerciale pour l'Afrique 165, Bld de Marseille B.P. 2323, Abidjan 08	Tel. +225 2579-44 Fax +225 2584-36

Japan			
Assembly **Sales** **Service**	**Iwata**	SEW-EURODRIVE JAPAN CO., LTD 250-1, Shimoman-no, Iwata Shizuoka 438-0818	Tel. +81 538 373811 Fax +81 538 373814 http://www.sew-eurodrive.co.jp sewjapan@sew-eurodrive.co.jp

Korea			
Assembly **Sales** **Service**	**Ansan-City**	SEW-EURODRIVE KOREA CO., LTD. B 601-4, Banweol Industrial Estate 1048-4, Shingil-Dong Ansan 425-120	Tel. +82 31 492-8051 Fax +82 31 492-8056 http://www.sew-korea.co.kr master@sew-korea.co.kr
	Busan	SEW-EURODRIVE KOREA Co., Ltd. No. 1720 - 11, Songjeong - dong Gangseo-ku Busan 618-270	Tel. +82 51 832-0204 Fax +82 51 832-0230 master@sew-korea.co.kr

Latvia			
Sales	**Riga**	SIA Alas-Kuul Katlakalna 11C LV-1073 Riga	Tel. +371 7139253 Fax +371 7139386 http://www.alas-kuul.com info@alas-kuul.com

Lebanon			
Sales	**Beirut**	Gabriel Acar & Fils sarl B. P. 80484 Bourj Hammoud, Beirut	Tel. +961 1 4947-86 +961 1 4982-72 +961 3 2745-39 Fax +961 1 4949-71 gacar@beirut.com

Lithuania			
Sales	**Alytus**	UAB Irseva Naujoji 19 LT-62175 Alytus	Tel. +370 315 79204 Fax +370 315 56175 info@irseva.lt http://www.sew-eurodrive.lt

Luxembourg			
Assembly **Sales** **Service**	**Brüssel**	CARON-VECTOR S.A. Avenue Eiffel 5 B-1300 Wavre	Tel. +32 10 231-311 Fax +32 10 231-336 http://www.sew-eurodrive.lu info@caron-vector.be

Malaysia			
Assembly **Sales** **Service**	**Johore**	SEW-EURODRIVE SDN BHD No. 95, Jalan Seroja 39, Taman Johor Jaya 81000 Johor Bahru, Johor West Malaysia	Tel. +60 7 3549409 Fax +60 7 3541404 sales@sew-eurodrive.com.my

Mexico			
Assembly **Sales** **Service**	**Queretaro**	SEW-EURODRIVE MEXIKO SA DE CV SEM-981118-M93 Tequisquiapan No. 102 Parque Industrial Queretaro C.P. 76220 Queretaro, Mexico	Tel. +52 442 1030-300 Fax +52 442 1030-301 http://www.sew-eurodrive.com.mx scmexico@seweurodrive.com.mx

Morocco			
Sales	**Casablanca**	Afit 5, rue Emir Abdelkader MA 20300 Casablanca	Tel. +212 22618372 Fax +212 22618351 ali.alami@premium.net.ma

Netherlands			
Assembly **Sales** **Service**	**Rotterdam**	VECTOR Aandrijftechniek B.V. Industrieweg 175 NL-3044 AS Rotterdam Postbus 10085 NL-3004 AB Rotterdam	Tel. +31 10 4463-700 Fax +31 10 4155-552 http://www.vector.nu info@vector.nu

New Zealand			
Assembly **Sales** **Service**	**Auckland**	SEW-EURODRIVE NEW ZEALAND LTD. P.O. Box 58-428 82 Greenmount drive East Tamaki Auckland	Tel. +64 9 2745627 Fax +64 9 2740165 http://www.sew-eurodrive.co.nz sales@sew-eurodrive.co.nz
	Christchurch	SEW-EURODRIVE NEW ZEALAND LTD. 10 Settlers Crescent, Ferrymead Christchurch	Tel. +64 3 384-6251 Fax +64 3 384-6455 sales@sew-eurodrive.co.nz

Norway			
Assembly **Sales** **Service**	**Moss**	SEW-EURODRIVE A/S Solgaard skog 71 N-1599 Moss	Tel. +47 69 24 10 20 Fax +47 69 24 10 40 http://www.sew-eurodrive.no sew@sew-eurodrive.no

Peru			
Assembly **Sales** **Service**	**Lima**	SEW DEL PERU MOTORES REDUCTORES S.A.C. Los Calderos, 120-124 Urbanizacion Industrial Vulcano, ATE, Lima	Tel. +51 1 3495280 Fax +51 1 3493002 http://www.sew-eurodrive.com.pe sewperu@sew-eurodrive.com.pe

Poland			
Assembly **Sales** **Service**	**Lodz**	SEW-EURODRIVE Polska Sp.z.o.o. ul. Techniczna 5 PL-92-518 Łódź	Tel. +48 42 67710-90 Fax +48 42 67710-99 http://www.sew-eurodrive.pl sew@sew-eurodrive.pl
		24 Hour Service	Tel. +48 602 739 739 (+48 602 SEW SEW) sewis@sew-eurodrive.pl

Portugal			
Assembly **Sales** **Service**	**Coimbra**	SEW-EURODRIVE, LDA. Apartado 15 P-3050-901 Mealhada	Tel. +351 231 20 9670 Fax +351 231 20 3685 http://www.sew-eurodrive.pt infosew@sew-eurodrive.pt

Romania			
Sales **Service**	**Bucureşti**	Sialco Trading SRL str. Madrid nr.4 011785 Bucuresti	Tel. +40 21 230-1328 Fax +40 21 230-7170 sialco@sialco.ro

Russia			
Assembly **Sales** **Service**	**St. Petersburg**	ZAO SEW-EURODRIVE P.O. Box 36 195220 St. Petersburg Russia	Tel. +7 812 3332522 +7 812 5357142 Fax +7 812 3332523 http://www.sew-eurodrive.ru sew@sew-eurodrive.ru

Senegal			
Sales	**Dakar**	SENEMECA Mécanique Générale Km 8, Route de Rufisque B.P. 3251, Dakar	Tel. +221 338 494 770 Fax +221 338 494 771 senemeca@sentoo.sn

Serbia			
Sales	**Beograd**	DIPAR d.o.o. Ustanicka 128a PC Košum, IV floor SCG-11000 Beograd	Tel. +381 11 347 3244 / +381 11 288 0393 Fax +381 11 347 1337 office@dipar.co.yu

Singapore			
Assembly **Sales** **Service**	**Singapore**	SEW-EURODRIVE PTE. LTD. No 9, Tuas Drive 2 Jurong Industrial Estate Singapore 638644	Tel. +65 68621701 Fax +65 68612827 http://www.sew-eurodrive.com.sg sewsingapore@sew-eurodrive.com

Slovakia			
Sales	**Bratislava**	SEW-Eurodrive SK s.r.o. Rybničná 40 SK-831 06 Bratislava	Tel. +421 2 33595 202 Fax +421 2 33595 200 sew@sew-eurodrive.sk http://www.sew-eurodrive.sk
	Žilina	SEW-Eurodrive SK s.r.o. Industry Park – PChZ ulica M.R.Štefánika 71 SK-010 01 Žilina	Tel. +421 41 700 2513 Fax +421 41 700 2514 sew@sew-eurodrive.sk

Slovakia			
	Banská Bystrica	SEW-Eurodrive SK s.r.o. Rudlovská cesta 85 SK-974 11 Banská Bystrica	Tel. +421 48 414 6564 Fax +421 48 414 6566 sew@sew-eurodrive.sk
	Košice	SEW-Eurodrive SK s.r.o. Slovenská ulica 26 SK-040 01 Košice	Tel. +421 55 671 2245 Fax +421 55 671 2254 sew@sew-eurodrive.sk

Slovenia			
Sales **Service**	**Celje**	Pakman - Pogonska Tehnika d.o.o. UI. XIV. divizije 14 SLO - 3000 Celje	Tel. +386 3 490 83-20 Fax +386 3 490 83-21 pakman@siol.net

South Africa			
Assembly **Sales** **Service**	**Johannesburg**	SEW-EURODRIVE (PROPRIETARY) LIMITED Eurodrive House Cnr. Adcock Ingram and Aerodrome Roads Aeroton Ext. 2 Johannesburg 2013 P.O.Box 90004 Bertsham 2013	Tel. +27 11 248-7000 Fax +27 11 494-3104 http://www.sew.co.za dross@sew.co.za
	Capetown	SEW-EURODRIVE (PROPRIETARY) LIMITED Rainbow Park Cnr. Racecourse & Omuramba Road Montague Gardens Cape Town P.O.Box 36556 Chempet 7442 Cape Town	Tel. +27 21 552-9820 Fax +27 21 552-9830 Telex 576 062 dswanepoel@sew.co.za
	Durban	SEW-EURODRIVE (PROPRIETARY) LIMITED 2 Monaceo Place Pinetown Durban P.O. Box 10433, Ashwood 3605	Tel. +27 31 700-3451 Fax +27 31 700-3847 dtait@sew.co.za

Spain			
Assembly **Sales** **Service**	**Bilbao**	SEW-EURODRIVE ESPAÑA, S.L. Parque Tecnológico, Edificio, 302 E-48170 Zamudio (Vizcaya)	Tel. +34 94 43184-70 Fax +34 94 43184-71 http://www.sew-eurodrive.es sew.spain@sew-eurodrive.es

Sweden			
Assembly **Sales** **Service**	**Jönköping**	SEW-EURODRIVE AB Gnejsvägen 6-8 S-55303 Jönköping Box 3100 S-55003 Jönköping	Tel. +46 36 3442 00 Fax +46 36 3442 80 http://www.sew-eurodrive.se info@sew-eurodrive.se

Switzerland			
Assembly **Sales** **Service**	**Basel**	Alfred Imhof A.G. Jurastrasse 10 CH-4142 Münchenstein bei Basel	Tel. +41 61 417 1717 Fax +41 61 417 1700 http://www.imhof-sew.ch info@imhof-sew.ch

Thailand			
Assembly **Sales** **Service**	**Chonburi**	SEW-EURODRIVE (Thailand) Ltd. 700/456, Moo.7, Donhuaroh Muang Chonburi 20000	Tel. +66 38 454281 Fax +66 38 454288 sewthailand@sew-eurodrive.com

Tunisia			
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Sales **Service**	**Dnepropetrovsk**	SEW-EURODRIVE Str. Rabochaja 23-B, Office 409 49008 Dnepropetrovsk	Tel. +380 56 370 3211 Fax +380 56 372 2078 http://www.sew-eurodrive.ua sew@sew-eurodrive.ua

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	Midwest Region	SEW-EURODRIVE INC. 2001 West Main Street Troy, Ohio 45373	Tel. +1 937 335-0036 Fax +1 937 440-3799 cstroy@seweurodrive.com
	Southwest Region	SEW-EURODRIVE INC. 3950 Platinum Way Dallas, Texas 75237	Tel. +1 214 330-4824 Fax +1 214 330-4724 csdallas@seweurodrive.com
	Western Region	SEW-EURODRIVE INC. 30599 San Antonio St. Hayward, CA 94544	Tel. +1 510 487-3560 Fax +1 510 487-6433 cshayward@seweurodrive.com
	Additional addresses for service in the USA provided on request!		

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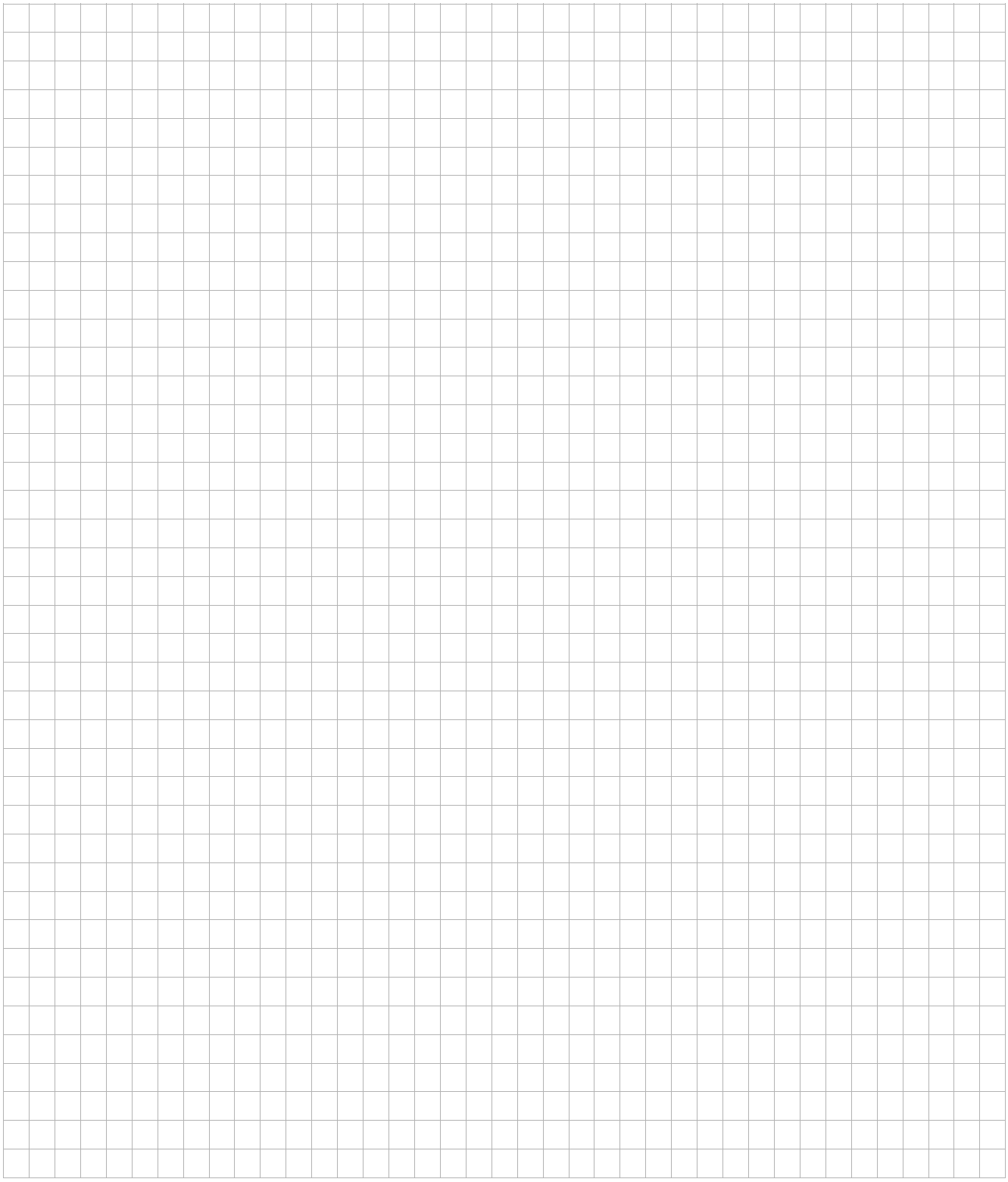

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